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U. S. DEPARTMENT OF THE INTERIOR
PROTOTYPE OIL SHALE LEASING PROGRAM

OIL SHALE TRACT C-b
DEVELOPMENT MONITORING REPORT #7
(May 1981 through November 1981)

Submitted to:

Mr. Peter A Rutledge
Deputy Conservation Manager - Oil Shale
Conservation Division
U. S. Geological Survey
Grand Junction, Colorado

By:

CATHEDRAL BLUFFS SHALE OIL COMPANY

TENNECO SHALE OIL COMPANY
OCCIDENTAL OIL SHALE, INC., OPERATOR

January 15, 1982

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Regular environmental reporting for Oil Shale Tract C-b in the current phase called Development Monitoring consists of the following reports:

<u>REPORT</u>	<u>SUBMITTAL DATE</u>
Six-Month Data Reports	January 15 July 15
Annual Report	April

Development Monitoring was initiated in April, 1978. Following is a list of semi-annual data reports which have been submitted to the Deputy Conservation Manager - Oil Shale.

<u>Report #</u>	<u>Date Submitted</u>	<u>Period of Data</u>
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This present report, Development Monitoring Report #7, contains data from May 1981 through November 1981. The time series plots will be presented as a supplemental report for this reporting period, expected to follow this report in approximately one month.

In order to maintain accuracy in the data base and reports, for errors that are found requiring corrections from previously reported data, the following actions have been taken:

- 1) Summary tables in this report and the C-b computerized data base reflect corrected data to the best of our knowledge.
- 2) Cross-reference tables to data corrections and the corrected diurnal tables appear in this report.
- 3) Cumulative correction cross-reference tables are included in this report.

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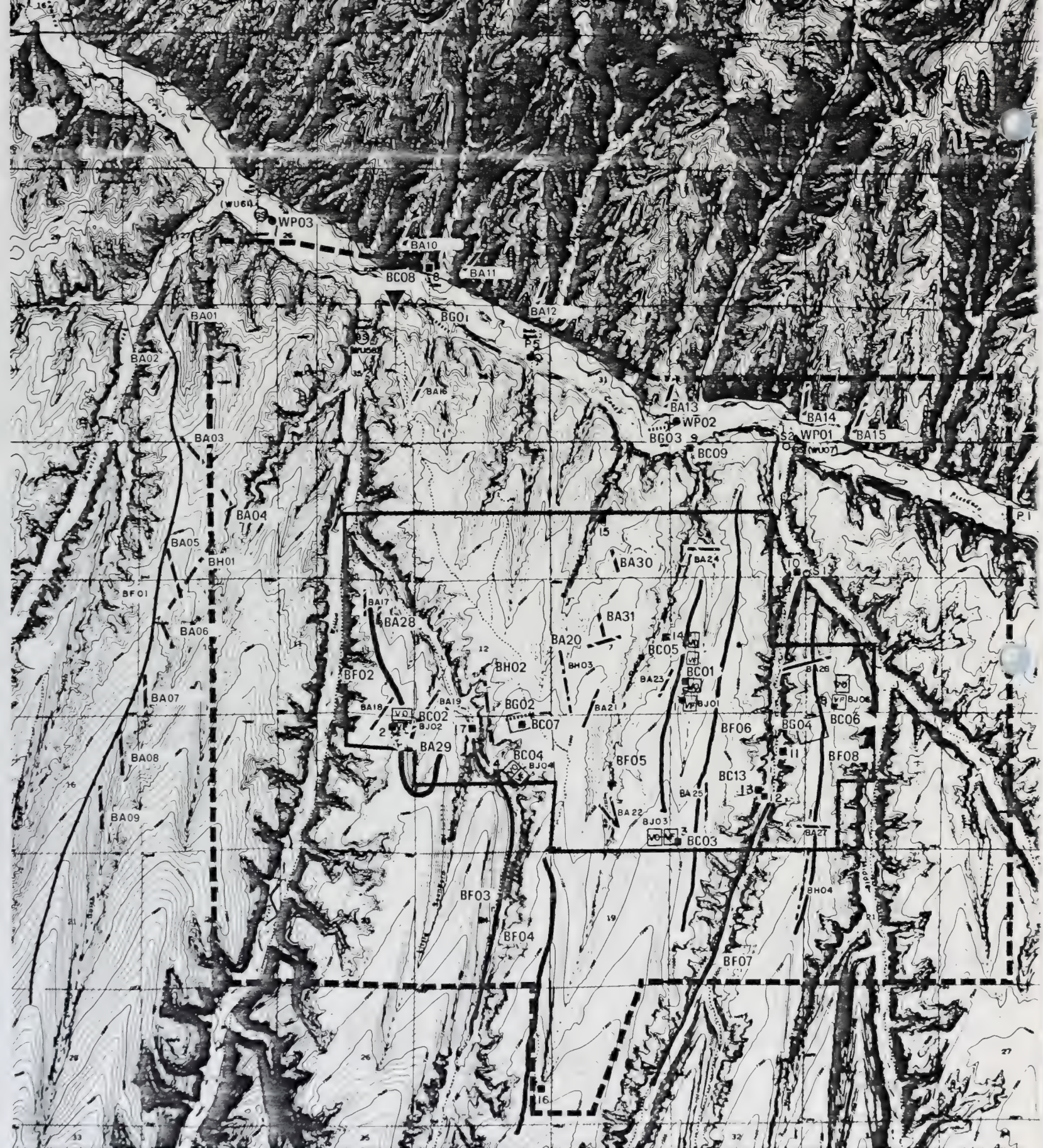
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2.5 Biology

Studies required by the Developmental Monitoring plan are contained in this section and are listed in the table of contents.

Monitoring stations referenced in this section are located on Figure 2.5-1, Biological Development Monitoring Program.

All monitoring stations are referenced by four-digit computer station codes. A cross-reference of the computer codes and station ID appear in section 4.0 (Data Automation).



- (GS) Water Gaging Station - Benthos
 (VO) Vegetation Site: VO= Open (50 x 70m)
 (VF) VF= Fenced (50 x 70m)
 ■ Microenvironmental Station
 ○ Fish Sampling
 ● Periphyton

- Animal Trap Site
 --- Deer Pellet and Browse Utilization Transects
 --- Ornithological Gamebird Study Transects
 — Predator Survey Lines
 ▼ Other Sensitive Areas

BIOLOGICAL DEVELOPMENT MONITORING PROGRAM

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2.5.1 Terrestrial Studies

Introductory data were gathered from June 1981 through November 1981. Tabular data include those for migrational patterns and phenology, road kills, natural mortality, browse production and utilization studies, coyote abundance, lagomorph abundance, small mammal trapping, and the raptor nesting study.

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2.5.1.1 Big Game: Mule Deer

Scope of Work

Mule deer studies conducted during this sample period include: road counts, road kills and mortality transects.

Methods

Pellet Group Densities

Pellet group counts were conducted along 30 permanent transects. Nine new transects were established in the brush beating areas. (See Figure 2.5.1.1-1) The plots were raked in the fall and the pellet groups were counted in the spring.

Browse Production and Utilization

Production and Utilization studies of bitterbrush were conducted along 19 transects consisting of 205 bitterbrush shrubs. The method consist of measuring lengths of current growth in the fall (10 shoots per shrub), marking main stems for relocation, and measuring what remains of the current annual growth in the spring.

Migrational Patterns and Phenology

Mule deer road counts were conducted in the same manner as during the baseline studies. The 41-mile length of Piceance Creek road was driven (from Rio Blanco Store to Highway 64) and all deer observed within one-mile intervals were recorded. All counts were made before dusk. Age class composition of mule deer wintering near tract C-b is shown in Table 2.5.1.1-1.

Road Kills

Mule deer road kill counts were conducted along the same 41-mile length of road as the mule deer counts. The method used was described in the monitoring plan. The dead deer were aged, sexed, and tagged.

Natural Mortality

Sampling was done in the spring on 10 plots located in lateral draws and sagebrush gulches. The age and sex of all deer that died the previous winter were recorded, and each carcass was marked with a metal tag, stamped with the current year.

Results

Pellet Group Densities

Pellet group density data will be presented in the 1981 Annual Report.

Browse Production and Utilization

Browse data will be in the 1981 Annual Report. Utilization seems to have decreased.

TABLE 2.5.1.1-1
DEER ROAD COUNT
(SEPTEMBER 1981 - NOVEMBER 1981)

	SEP 24	OCT 8	16	22	30	NOV 5	12
MILES							
BE30						4	
BM00				29			
BM01					2		
BM04				4			
BM09				10	5		10
BM10			6	38			
BM11						3	6
BM12				4			3
BM13					1		6
BM14			16	10	4		
BM15			15	17			
BM16			7	9			1
BM17			3	4			
BM18			38	77	37	6	19
BM19				24	8	18	48
BM20			27	28			12
BM21			7	18	40	44	5
BM22			4	8	2	5	13
BM23			4			12	6
BM24					8	67	26
BM25			7			11	
BM26			13	7		4	
BM29				6			
BM30						10	
BM31			12			6	
BM32				2			
BM39						2	
BM40			12	5			
BM41			8	2			
BN00	7					1	
BN04				3			
BN05							1
BN16			2				
BN18							5
BN20				1			
BN21			6				
BN22			2				
BS10					4		
BS12					1		
BS18					2		
TOTAL	7		189	306	114	193	161

Road Kill

Road kill data are presented in Table 2.5.1.1-2,

Natural Mortality

Mule deer natural mortality results are shown in Table 2.5.1.1-3.

Table 2.5.1.1-2

DEER ROAD KILL

(SEPTEMBER 1981 - NOVEMBER 1981)

	SEP	OCT					NOV	
	24	1	8	16	22	30	5	12
MILES	<hr/>							
BN00								
BN04					1			
BN05						1		1
BN14								1
BN15								1
BN16							2	
BN18								1
BN20								1
BN25						1		
BN31							1	
BN39			1					
TOTAL			1		1	2	3	5

TABLE 2.5.1.1-3

Age Class Composition of Mule Deer Wintering Near Tract C-b.

Date	Fawns	Does	Bucks	Adults	Fawns/ 100 Does	Bucks/ 100 Does	Fawns/ 100 Adults
Nov. - NO COUNT							
Apr. 22-24, 1981	24			68			35.2

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2.5.1.2 Medium-Sized Mammals

Scope of Work

Medium-sized mammal studies consist of coyote and lagomorph (cottontails and jackrabbits) abundance.

Methods

Coyote Abundance

Coyote abundance was calculated using data collected in October from 30 miles of scent posts (based on U.S. Fish and Wildlife Service design), set one day and collected the following day.

Lagomorph Abundance

Lagomorph pellet counts are collected along the same transects used for deer pellet group densities. Plot size is .001 acre; plots are checked in the spring and the fall.

Results

Coyote Abundance

Coyote abundance data are presented in Table 2.5.1.2-1.

Lagomorph Abundance

Lagomorph abundance data are presented in Table 2.5.1.2-2.

Table 2.5.1.2-1 Results of the coyote scent station survey, 1981.

Line	Location	No. of Stations	No. of Visits
1	Big Jimmy	25	0
2	Scandard Ridge	10	2
3	Scandard Gulch	10	0
4	SG-15	10	0
5	SG-3	10	0
6	Stewart Ridge	15	1
7	West Stewart Valley	10	0
8	Bailey Ridge	10	1

$$\begin{aligned}
 \text{Index of abundance} &= \frac{\text{No. of visits}}{\text{No. of stations}} \times 1000 \\
 &= \frac{5}{100} \times 1000 = 50
 \end{aligned}$$

Table 2.5.1.2-2 Relative abundance of cottontails and jackrabbits, 1980-81. Each transect consists of twenty 0.001 acre plots.

Transects	No. of plots with lagomorph droppings	
	Spring	Fall
Chained habitat:		
BA01	5	14
BA02	6	12
BA03	12	15
BA04	12	5
BA05	12	17
BA06	9	20
BA07	13	14
BA08	10	6
BA09	13	14
BA17	10	12
BA18	5	7
BA25	11	13
BA20	8	9
BA21	9	13
BA23	8	12
BA30	5	15
BA31	7	14
BA32	6	8
Pinyon-juniper habitat:		
BA10	16	16
BA11	11	6
BA12	15	13
BA13	12	9
BA14	12	2
BA15	10	7
BA16	12	14
BA19	11	18
BA22	16	13
BA24	8	13
BA26	15	13
BA27	15	15
Brush beating:		
BA41	5	6
BA42	4	7
BA43	18	14
BA44	3	12
BA45	1	6
BA46	2	5
BA47	6	9
BA48	15	13
BA49	18	12

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2.5.1.3 Small Mammals

Scope of Work

Small mammal studies consist of obtaining information on relative abundance, species composition, reproductive condition, and age-class.

Methods

Small mammal trapping was conducted in June and August on control and developmental plots in the chained pinyon-juniper habitat type. Areas within the sprinkler system were compared to controls outside the sprinkler area. The control plot BG04 for pinyon-juniper was also sampled. Trapping occurred for three consecutive nights (omitting rainy nights); after each night, all traps were moved to an adjacent trap location. Each night 330 traps were set.

Results

Data for small mammals will be presented in the Annual Report.

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2.5.1.4 Avifauna

Introduction

No additional avifauna studies on songbirds or gamebirds were conducted during this period. Raptor nest censusing for 1981 was conducted in April and June.

Scope of Work

Fifty-two raptor nests were checked for nesting activity.

Methods

Nests were found using photographs and topographic maps of their locations. Observations were made using a spotting scope from a safe distance (50 meters or more) so as not to disturb possible nesting activity. Any new or undocumented nests were photographed and recorded. Where there was no observed activity, close examination of the nest was made to look for fresh pellets, whitewash or green material.

Results

The results from the 1981 raptor nest censusing are presented in Table 2.5.1.4-1. Eight nests had signs of activity.

TABLE 2.5.1.4-1

RAPTOR NESTING RECORD

Nest No.	Species	Status 1976		Status 1977		Status 1978		Status 1979		Status 1980		Status 1981	
		April	June	April	June	April	June	April	June	April	June	April	June
1	Unknown	I		I	I	I	I	I	I	I	I	I	I
2	Unknown	I		I	I	I	I	I	I	I	I	I	I
3	Unknown	I		I	I	I	I	I	I	I	I	Nest Gone	
4	Red-tailed Hawk	E or Y		I	I	I	I	I	I	I	I	I	I
5	Unknown	I		I	I	I	I	I	I	I	I	I	I
5a	Common Raven	-		-	E or Y	I	I	I	I	I	I	A	I
6	Golden Eagle	E		I	2Y	I	I	E or Y	I	1Y	1Y	E	I
7	Red-tailed Hawk	I		I	-	E	I	E or Y	I	E or Y	1Y	E	2Y
8	Red-tailed Hawk	4Y		I	I	E	I	E or Y	I	I	I	I	I
9	Common Raven	I		I	I	I	I	I	I	E	2Y	I	I
10	Red-tailed Hawk	I		I	I	I	I	I	I	I	I	I	I
11	Nest Gone												
12	Red-tailed Hawk	I		I	I	E	1Y	I	I	I	I	I	I
13	Red-tailed Hawk	I		I	I	I	I	E or Y	I	I	I	I	I
14	Unknown	I		I	I	I	I	I	I	I	I	I	I
15	Unknown	I		I	I	I	I	I	I	I	I	I	I
16	Great Horned Owl	I		I	I	E	2Y	I	I	I	I	I	I
17	Great Horned Owl	I		I	I	I	I	I	I	I	I	I	I
18	Red-tailed Hawk	I		I	I	I	I	1Y	I(GHO)	I	I	I	I
19	Great Horned Owl	1Y		I	I	I	I	I	I	I	I	I	I
20	Unknown							I	I	Packrats			
21	Not on map												
22	Red-tailed Hawk	I		I	I	I	I	E or Y	I	I	2Y	A	I
23	Not on map												
24	Red-tailed Hawk	I		I	I	I	I	I	I	Packrats		E	(?)Y
25	Great Horned Owl	I		I	I	I	I	I	I	Packrats			
26	Unknown	I		I	I	I	I			Nest Gone			
27	Red-tailed Hawk	I		I	I	I	I	E or Y	I	I	I	E	1Y
28	Golden Eagle	1Y		I	I	I	I	I	I	I	I	I	I
29	Unknown	I		I	I	I	I	I	I	I	I	I	I
30	Red-tailed Hawk	2Y		I	I	I	I	I	I	I	I	I	I
31	Unknown	I		I	I	I	I	I	I	I	2Y(RTH)	I	I
32	Great Horned Owl	2Y		2Y	-	I	I	I	I	I	I	I	2Y(RTH)
33	Unknown	I		I	I	I	I	I	I	I	I	I	2Y(RTH)
34	Unknown	I		I	I	I	I	I	I	I	I	I	I
35	Unknown	I		I	I	I	I	I	I	I	I	I	I
36	Red-tailed Hawk	2Y		I	I	I	I	E	2Y	I	I	I	I
37	Unknown	I		I	I	I	I	I	I	I	I	I	I
38	Raven	I		I	I	I	I	E or Y	Y	I	E or Y	A	A
39	Golden Eagle	1Y		I	I	I	I	I	I	I	I	I	I
40	Great Horned Owl	I		I	I	E	2Y	2Y	I	I	I	I	I
41	Unknown	I		I	I	I	I			Nest Gone			
42	Unknown	I		I	I	I	I	I	I	I	I	I	I
42a	Red-tailed Hawk	-		-	2Y	I	I	E or Y	I(GHO)	I	I	I	I
43	Great Horned Owl	2Y		I	I	I	I	I	I	I	I	I	I
44	Unknown	I		I	I	I	I	I	I	I	I	I	I
45	Red-tailed Hawk	2Y		I	I	I	I	E	2Y	I	2Y	I	I
46	Red-tailed Hawk					E	I	E or Y	I	I	I	I	I
47	Unknown					I		I	I	I	I	I	I
48	Great Horned Owl							E	I	I	I	E(RTH)	1Y
49	Red-tailed Hawk							E	I	I	I	I	I
50	Magpie									I	I	I	I
51	Red-tailed Hawk									I	1Y	I	I
*52	Red-tailed Hawk									I	I	I	1Y
TOTAL ACTIVE NESTS		11		4		6		15		8		8	

Code:

I = inactive nest

A = signs of activity, (ex. fresh boughs, bird near nest)

E = adult bird observed in an incubating posture; presumed to be incubating eggs.

(2) Y = number of young observed in the nest.

E or Y = adult bird observed in an incubating posture; due to time of year, assumed to be either incubating eggs or brooding very young chicks.

* = new nest

2.5.2 Aquatic Studies

Introduction

Aquatic sampling was conducted from May 1981 through November 1, 1981.

Scope of Work

Aquatic studies for this period consisted of: periphyton and benthos sampling.

Methods

Benthos

Benthic macroinvertebrate sampling stations located in Piceance Creek (Figure 2.5.2-1) are the same as the current periphyton collection stations. Six collections were obtained at approximately one month intervals between May and October, 1981. C.B. staff biologists used a standard Surber sampler to provide three replicates from each station per sampling date. Each replicate was placed in a labeled container, preserved with 10% formalin on site, and mailed to Mariah Associates' Aquatics Laboratory in Laramie, Wyoming for further processing and analysis.

Upon arrival, the samples are washed over a fine mesh sieve (U.S. NO. 60). Organisms are separated from debris and placed in vials of 80% ethyl alcohol. Identification and enumeration are accomplished with the aid of a Bausch and Lomb Stereo Zoom 7 (5x-210x) dissecting microscope. Whole oligochaete and chironomid head capsules are mounted in Hoyers cleaning and mounting medium and identified with the use of a Wild Heerbrugg microscope at a magnification of 200x or 400x.

Periphyton

The 1981 periphyton sampling stations located in Piceance Creek are identified as WP01 (Stewart Gulch near USGS Station WU07), WP02 (Middle Station) and WP03 (Hunter Creek near USGS Station WU61). Station WP01 was moved in 1977 from a baseline location of P-1 farther upstream, to its current position as a control station above development impact. Table 8.6.2-1 in the C.B. 1979 Annual Report provides a cross reference to the station codes.

Periphyton are collected from artificial substrates (glass slides) at each station during every sampling period. The glass slides are incubated in the water for at least 21 days. Nine slides are collected from each station, placed in individual cytmailers and preserved with 4% formalin. Three of the nine slides are used for taxonomic identification and enumeration, three for biomass determinations and three are extra slides in case any of the others become damaged.

The cytmailers are sent to Mariah Associates' Aquatics Laboratory in Laramie, Wyoming. All field procedures are executed by C.B. personnel.

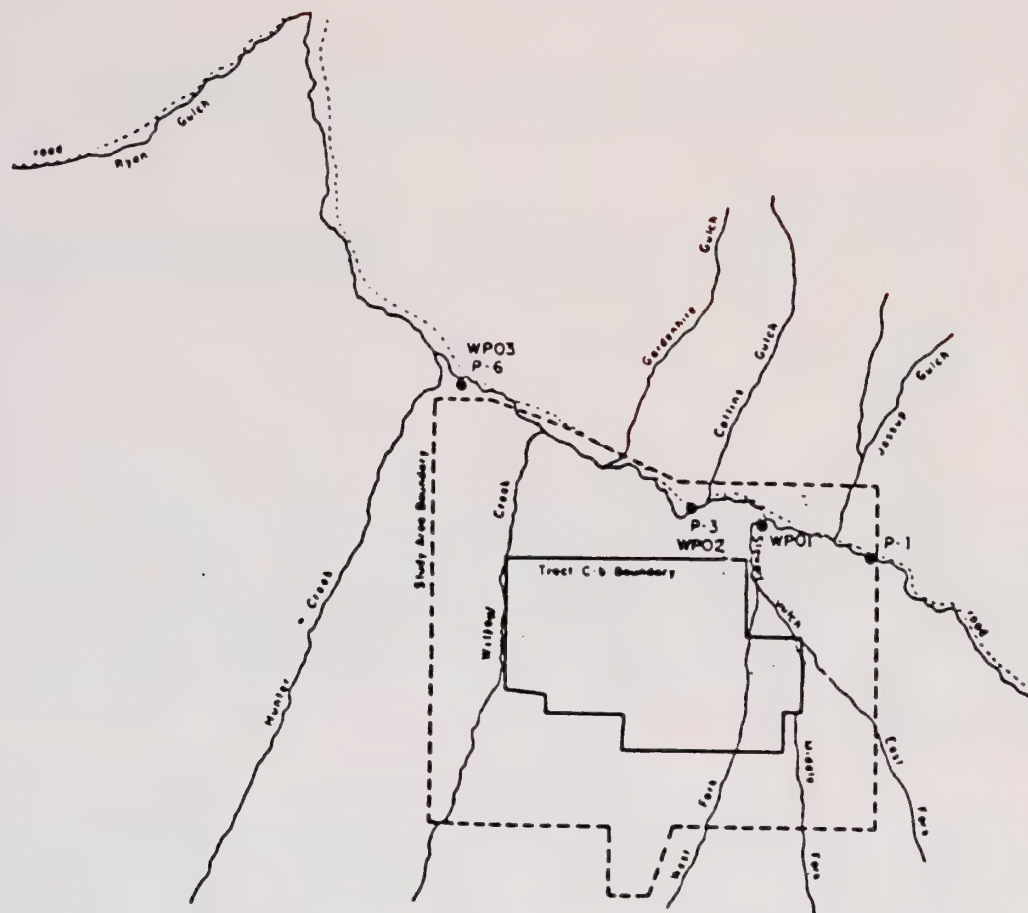


Figure 2.5.2-1

BENTHIC MACROINVERTEBRATE AND PERIPHYTON SAMPLING STATIONS

Five collections were obtained during the period of June through October 1981. A different type of slide holder was initiated into the program on July 2, 1981. The original type was also retained in order to compare the results from both kinds. Nine slides from each periphytometer were collected on August 1, 1981 and for the remainder of the 1981 study period. Biomass determinations and periphyton taxonomic identification and enumeration were performed on the August 1, 1981 collections. Only biomass determinations were performed on the collections from the old sampler for the remainder of the year.

Upon arrival, the biomass is removed from the slides with a razor blade, and the scrapings placed in separate crucibles to be dehydrated in a drying oven at 105 to 110°C. Samples are then cooled to room temperature in a dessicator and weighed to the nearest 0.0001 g (gross dry weight). After ashing in a muffle furnace at 450°C for approximately four hours, the samples are rewet upon cooling to replace their water of hydration, redried to a constant weight at 105 to 110°C and weighed to the nearest 0.0001 g (gross ash weight). Ash-free dry weight is obtained by subtracting gross ash weight from gross dry weight since the evaporating dish tare is assumed to be identical for the two weights.

Ash-free dry weight biomass is calculated according to the following equation:

$$\text{biomass (mg/cm}^2\text{)} = \frac{Wd - Wa}{As}$$

where: Wd = dry weight plus tare, mg
Wa = ash weight plus tare, mg
As = area scraped from slide, cm²

Algae other than diatoms are identified directly from the slides with 200x or 400x magnification. The periphyton are then scraped from each slide with a razor blade and placed into separate jars. The contents of each jar are identified according to species composition and relative abundance.

Results

Benthos

Benthos data are presented in Tables 2.5.2-1 - 2.5.2-3.

Periphyton

Periphyton data are presented in Tables 2.5.2-4 - 2.5.2-8.

BENTHOS DATA

<u>Table 2.5.2-1 Benthos Species List</u>	Page No. III-26
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May, 1981	
Station 1 WP01	III-34
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Station 3 WP03	III-35
June, 1981	
Station 1	III-36
Station 2	III-36
Station 3	III-37
July, 1981	
Station 1	III-38
Station 2	III-38
Station 3	III-39
August, 1981	
Station 1	III-40
Station 2	III-40
Station 3	III-41
September, 1981	
Station 1	III-42
Station 2	III-42
Station 3	III-43
November, 1981	
Station 1	III-44
Station 2	III-44
Station 3	III-45
<u>Table 2.5.2-3 BENTHOS DENSITY AND SPECIES DIVERSITY CALCULATIONS</u>	III-46
May, 1981	
Station 1	III-46
Station 2	III-47
Station 3	III-48
June, 1981	
Station 1	III-50
Station 2	III-51
Station 3	III-52
July, 1981	
Station 1	III-53
Station 2	III-54
Station 3	III-55

BENTHOS DATA

BENTHOS DENSITY AND SPECIES CALCULATIONS (continued)

	Page No.
August, 1981	
Station 1	III-57
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Station 1	III-60
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November, 1981	
Station 1	III-64
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Station 3	III-66

Table 2.5.2-1

BENTHIC SPECIES LIST

CATHEDRAL BLUFFS SHALE OIL COMPANY
PISCANCE CREEK
1981

TAXON	STATION NUMBER		
	1	2	3
PHYLUM NEMATODA	X	X	X
PHYLUM ANNELIDA			
CLASS OLIGOCHAETA			
ORDER HAPLOTAXIDA			
FAMILY TUBIFICIDAE	X	X	X
FAMILY LUMBRICULIDAE	X	X	X
FAMILY NAIADIDAE	X	X	X
PHYLUM ARTHROPODA			
CLASS CRUSTACEA			
ORDER AMPHIPODA			
FAMILY TALITRIDAE			
HYALELLA ATTECA		X	X
FAMILY GAMMARIDAE			
GAMMARUS LACUSTRIS	X		
CLASS ARACHNIDA			
ACARINA	X		
CLASS INSECTA			
ORDER EPHEMEROPTERA			
FAMILY BAETIDAE			
BAETIS	X	X	X
PSEUDOCLOON	X		
FAMILY EPHEMERELLIDAE			
EPHEMERELLA (EPHEMERELLA)	X	X	X
EPHEMERELLA (SERRATELLA)	X	X	
FAMILY LEPTOPHELIIDAE			
CHOROTERPS (CHOROTERPS)	X		
FAMILY TRICORYTHIDAE			
TRICORYTHODES	X	X	X
ORDER PLECOPTERA			
FAMILY PLECOPTERIDAE			
ISOPERLA	X	X	X
ORDER COLEOPTERA			
FAMILY DRYOPIDAE			
HELICHIUS	X		
FAMILY FLMIDAE			
OPTIOSERVUS	X	X	X
FAMILY HYDROPHILIDAE			
HELIOPHORUS			X
FAMILY HALIPIDAE			
BYCHUS	X	X	X
FAMILY NYCTICIDAE			
AGARUS	X	X	X
ORDER CYCLOPODA AND DERONESTES			
ORDER TRICHOPTERA			
FAMILY HYDROPSYCHIDAE			
HYDROPSYCHE	X	X	
FAMILY HYDROPTILIDAE			
HYDROPTILA	X	X	X
FAMILY LIMNIPHTILIDAE			
HEPESOPHYLAX			X
FAMILY GLOSSOPHTALIDAE			
GLOSSOPHTALIA	X		
ORDER DIPTERA			

PENTHOS SPECIES LIST

CATHEDRAL BLUFFS SHALE OIL COMPANY
PICEANCE CREEK

SPECIES OCCURRENCE BY SAMPLING DATE AT STATION 1
1981

TAXON	SAMPLING DATE				
	MAY	JUNE	JULY	AUG	SEPT
PHYLUM NEMATODA	X	X	X	X	X
PHYLUM ANNELIDA					
CLASS OLIGOCHAETA					
ORDER HAPLOTAXIDA					
FAMILY TURFICIDAE	X	X	X	X	X
FAMILY LUMBRICULIDAE	X	X	X	X	X
FAMILY NAIDIDAE					
PHYLUM APTRHOPODA					
CLASS CRUSTACEA					
ORDER AMPHIPODA					
FAMILY GAMMARIDAE					
GAMMARUS LACUSTRIS	X	X			
CLASS ARACHNIDA					
ACAFINA			X		
CLASS INSECTA					
ORDER EPHEMEROPTERA					
FAMILY BAETIDAE					
BAETIS	X	X	X	X	X
PSEUDOCLOERN					
FAMILY EPHEMERELLIDAE					
EPHEMERELLA (EPHEMERELLA)	X				
EPHEMERELLA (SERRATILLA)					
FAMILY LEPTOPHELBIDAE					
CHOROTERES (CHOROTERES)					
FAMILY TRICORYTHIDAE					
TRICORYTHIDAE	X	X	X	X	X
ORDER PLECOPTERA					
FAMILY PERLOIDAE					
ISOPPERLA	X				
ORDER COLEOPTERA					
FAMILY GRYPOIDAE					
HELICHIUS					
FAMILY ELMIIDAE					
OPTICSERVUS	X	X	X	X	X
FAMILY HALIOLIDAE					
REYCHUS					
FAMILY CYTISCIDAE					
AGABUS	X	X	X	X	X
ORDER TRICHOPTERA					
FAMILY HYDROPSYCHIDAE					
HYDROPSYCHIDAE	X	X	X	X	X
FAMILY HYDROPTILIDAE					
HYDROPTILIDAE					
FAMILY GLOSSOSOMATIDAE					
GLOSSOSOMA	X				
ORDER TIPITERA					
FAMILY CEPATOPOGONIDAE					
SUPFAMILY CEPATOPOGONIDAE	X	X	X	X	X
FAMILY CHIRONOMIDAE					
SUBFAMILY TANYPODINI					
TRIBE PENTANEUPINI	X				

BENTHOS SPECIES LIST

CATHEDRAL BLUFFS SHALE OIL COMPANY
PICEANCE CREEK

SPECIES OCCURRENCE BY SAMPLING DATE AT STATION 2
1981

TAXON	SAMPLING DATE				
	MAY	JUNE	JULY	AUG	SEPT
PHYLUM NEMATODA					
PHYLUM ANNELIDA					
CLASS OLGICHOCHAETA					
ORDER PAPILLOSTOMATA					
FAMILY TUBIFICIDAE	X	X	X	X	X
FAMILY LUMBRICULIDAE	X				
FAMILY NAIADIDAE			X	X	X
PHYLUM ARTHROPODA					
CLASS CRUSTACEA					
ORDER AMPHIPODA					
FAMILY TALITRIDAE					
HYALELLA AZTECA			X		
CLASS INSECTA					
ORDER EPHEMEROPTERA					
FAMILY BAETIDAE	X	X	X	X	
FAMILY EPHEMERELLIDAE					
EPHEMERELLA (EPHEMERELLA)	X				
EPHEMERELLA (SEPRATELLA)					X
FAMILY TRICORYTHIDAE	X	X	X	X	
TRICORYTHIDAE					
ORDER PLECOPTERA					
FAMILY PERLODIDAE					
ISOPERLA	X			X	X
ORDER COLEOPTERA					
FAMILY ELMIDAE					
OPTICSERVUS	X		X	X	X
FAMILY HALIPLIDAE					
BRUCHIUS		X	X	X	X
FAMILY DYTISCIDAE	X	X			
ACARUS					
ORDER TRICHOPTERA					
FAMILY HYDROPSYCHIDAE					
HYDROPSYCHE			X		
FAMILY HYDROPTILIDAE					
HYDROPTILA				X	X
FAMILY LIMNETHILIDAE					
HEPEROPHYLAX	X				
ORDER DIPTERA					
FAMILY CERATOPOGONIDAE					
SUBFAMILY CERATOPOGONINAE	X	X			X
FAMILY CHIRONOMIDAE					
SUBFAMILY TANYPOGONINAE					
TRIBE PENTANEURINI	X				
TRIBE MACROPLEPTINI	X				
SUBFAMILY DIANESINAE	X				
TRIBE PRODIANESINI	X				
SUBFAMILY ORTHOCLEADINI					
TRIBE CORYNOMERINI	X				
TRIBE ORTHOCLEADINI AND METRICONE	X	X	X	X	X
SUBFAMILY CHIRONOMINAE					

BENTHOS SPECIES LIST

CATHEDRAL PLUFFS SHALE OIL COMPANY
PISCAPAGE CREEK

SPECIES OCCURRENCE BY SAMPLING DATE AT STATION 3
1991

TAXON	SAMPLING DATE				
	MAY	JUNE	JULY	AUG	SEPT OCT
PHYLUM NEMATODA			X	X	
PHYLUM ANNELIDA					
CLASS OLIGOCHAETA					
ORDER HAUTAXIDA					
FAMILY TUBIFICIDAE	X	X	X	X	X
FAMILY LUMBRICULIDAE		X	X	X	X
FAMILY NAIADIDAE		X		X	
PHYLUM ARTHROPODA					
CLASS CRUSTACEA					
ORDER AMPHIPODA					
FAMILY TALITRIDAE					
HYALINELLA AZTECA	X				
CLASS INSECTA					
ORDER EPHEMEROPTERA					
FAMILY BAETIIDAE					
BAETIS	X		X	X	X
FAMILY EPHEMERELLIDAE					
EPHEMERELLA (EPHEMERELLA)	X				
FAMILY TRICORYTHIDAE					
TRICORYTHOIDES	X	X	X	X	X
ORDER PLECOPTERA					
FAMILY PLECOPTIDAE					
ISOPERLA	X				
ORDER COLEOPTERA					
FAMILY ELMIIDAE					
OPTIOSERVUS	X		X	X	X
FAMILY HYDROPHILIDAE					
HELIOPHORUS		X			
FAMILY HALIPLIDAE					
BRYCHIUS			X	X	X
FAMILY CYTISCIDAE					
AGARUS		X	X		
OREOXYTES AND DERONECTES		X			
ORDER TRICHOPTERA					
FAMILY HYDROPTILIDAE					
HYDROPTILA					X
ORDER DIPTERA					
FAMILY CERATOPOGONIDAE					
SUBFAMILY CERATOPOGONINAE	X				
FAMILY CHIRONOMIDAE					
SUBFAMILY TANYPODINAE					
TRIBE MACROPLEOPINI	X				X
SUBFAMILY DIAMESINAE					
TRIBE PRODIAMESINI	X				
SUBFAMILY EPTHOCLADIINAE					
TRIBES ORTHOCLADIINI AND METRICNE	X	X	X	X	X
SUBFAMILY CHIRONOMINAE					
TRIBE CHIRONOMINI	X	X	X	X	X
TRIBE TANYTARSINI	X			X	X
FAMILY DOLICHOPODIDAE					
FAMILY SIMULIIDAE					

Table 2.5.2-2

REYNOLDS DATA SHEET

CATHEDRAL HILLS SHALE OIL COMPANY
PISCATAWAY CREEK

SAMPLE SITE: 1 STEWART STATION

SAMPLE DATE - 052981

NUMBER OF REPLICATES - 3

SAMPLER SIZE - 929.0 CM²

CODE	TAXON	REPLICATE DESIGNATION		
		A	B	C
TIPS	PERIDICA LATREILLE	16	40	4
DICA	LICHANOTA	3	8	4
TRIC	TRICOPHYTHODES	3	8	0
BAET	BAETIS	2	4	0
OPTI	OPTIOSERVUS	3	28	0
MYSP	MYCOPUSCH	3	8	8
ISOP	ISOPHILA	14	80	12
EPEP	EPHEMERELLA (EPHEMERELLA)	2	0	4
TIFA	TIPULA	5	8	0
EUPA	EUPARYPHUS	1	0	4
ACAP	ACARUS	1	0	0
GAMK	GAMMARUS LACUSTRIS	4	0	0
GLSD	GLYSSODOMA	1	0	0
NEMA	PHYLOUS NEMATODA	1	0	0
TRUM	TRIPLES OPTOCLOACINI AND METRIPLOCEMIINI	1024	720	360
CERE	SUCFAMILY CEPATOPGONINAE	1	0	0
CHIT	CHITONOMINI	1	4	0
TANI	TANYTASSINI	1	0	0
CLRY	CLRYNOMOPINI	0	4	0
PENT	PENTAPLEURINI	0	4	0
ICBY	FAMILY TUFITICIDAE	22	24	0
LUPR	FAMILY LUPRITICULIDAE	0	0	4

SAMPLE SITE: 2 MIDDLE STATION

SAMPLE DATE - 052981

NUMBER OF REPLICATES - 2

SAMPLER SIZE - 929.0 CM²

CODE	TAXON	REPLICATE DESIGNATION		
		A	B	C
DICA	LICHANOTA	4	16	20
BAET	BAETIS	16	12	16
ISOP	ISOPHILA	60	8	20
EPEP	EPHEMERELLA (EPHEMERELLA)	8	28	4
OPTI	OPTIOSERVUS	8	4	0
CERE	SUCFAMILY CEPATOPGONINAE	16	4	4
TRIC	TRICOPHYTHODES	0	4	4

TIPS	HEXATEMA	LATRETIID	0	4	0
TIPA	TIPULA		0	0	8
AGAR	AGARUS		0	0	4
HESE	HESEPHOMYLAX		0	0	4
TRDM	TRIPES CATHECLADINI AND METRICONEMIINI	56	416	668	
CHIT	CHITON	24	36	140	
TANT	TANTARINI	4	0	0	
PENT	PENTASTURINI	4	0	0	
CDRY	CDRYGAGUCINI	0	4	4	
PRDD	PRDDIAPESINI	0	4	8	
PACX	PACXOPICOPINI	0	0	4	
TUAY	TUAYFICIDAE	168	92	172	
LUXA	LUXAULICIDAE	0	0	4	

SAMPL SITE 2 WINTER STATION

SAMPLE DATE - 042861
 NUMBER OF REPLICATES - 3
 SAMPLE SIZE - 429.0 CV2

CODE	TAXON	REPLICATE DESIGNATION		
		A	B	C

EPER	EPHEMERELLA (EPHEMERELLA)	36	40	68
TRIC	TRICOPYTHODES	44	84	92
BAET	BAETIS	20	16	20
ISOP	ISOPHELA	4	4	4
CPIT	CPITUSIPVUS	4	4	12
TIPS	HEXATEMA	12	8	4
TIPA	TIPULA	4	0	0
CEPE	SUBFAMILY CERATOPOGONINAE	0	4	4
MYAZ	MYALELLA AZTECA	0	4	0
TANT	TANTARINI	0	4	0
CHIT	TRIPES CATHECLADINI	156	128	284
TRDM	TRIPES CATHECLADINI AND METRICONEMIINI	292	340	540
PRDD	TRIPES PRODIAPESINI	8	4	20
PACX	TRIPES PACXOPICOPINI	4	0	4
TUAY	FAMILY TUAYFICIDAE	200	332	252

RENTON DATA SHEET

CATHEDRAL BLUFFS SHALE OIL COMPANY
PICANCE CREEK

SAMPLE SITE: 1 STEWART STATION

SAMPLE DATE - 06/08/01
NUMBER OF REPLICATES - 3
SAMPLE SIZE - 629.0 CM2

CODE TAXON REPLICATE DESIGNATION
A B C

TIPA	TIPULA	2	2	0
TIPS	HEXATOMA LATREILLE	6	2	1
ACAR	ACARUS	1	1	2
PHYS	HYALOPSYCHE	1	0	1
BACT	BACTIS	11	6	8
PHYS	PHYS	2	0	0
GAMA	GAMARUS LACUSTRIS	0	1	0
NEMA	PHYLUM NEMATODA	0	3	1
DICK	DICRANOTA	0	1	0
OPTI	OPTIOSEVUS	2	1	3
TRON	TRIPLES ORTHOCLOADINI AND METRIONCNEPINI	13	69	62
CHET	TRIPER CHIRONOMINI	0	1	0
PROG	TRIPER PROTAPESINI	0	1	0
CONE	SUPERFAMILY CENATOPPOGNIINAF	0	1	2
TURY	FAMILY TURFICIDAE	47	124	14
LLAR	FAMILY LUNARICULIDAE	1	0	0

SAMPLE SITE: 2 MIDDLE STATION

SAMPLE DATE - 06/08/01
NUMBER OF REPLICATES - 3
SAMPLE SIZE - 629.0 CM2

CODE TAXON REPLICATE DESIGNATION
A B C

TIPS	HEXATOMA LATREILLE	4	1	0
ACAR	ACARUS	0	2	0
PHYS	PHYS	0	1	0
TIPA	TIPULA	0	1	0
TALC	TRICORYTHOSES	0	2	1
NEMA	PHYLUM NEMATODA	0	1	0
MUSC	FAMILY MUSCICAE	0	1	0
TRON	TRIPLES ORTHOCLOADINI AND METRIONCNEPINI	24	14	13
CHET	TRIPER CHIRONOMINI	0	0	1
TURY	FAMILY TURFICIDAE	1128	530	616
CONE	SUPERFAMILY CENATOPPOGNIINAF	0	0	1

SAMPLE SITE: 3 HUNTER STATION

SAMPLE DATE - 0630H
 NUMBER OF REPLICATES - 3
 SAMPLE SIZE - 629.0 CM²

REPLICATE DESIGNATION

CODE	TAXON	A			B			C		
		A	B	C	A	B	C	A	B	C
TIPS	MEPHATOMA LATREILLE	4	6	11						
TIPA	TIPULA	1	0	1						
TRIC	TRICOPHYTHOES	7	17	13						
ELL	ELIOPHAPS	1	2	1						
ACAS	ACERUS	0	1	0						
PHYS	PHYSA	0	1	0						
GRPS	GRUGUYES AND DERONOTES	0	1	0						
MUSC	FAMILY MUSCIDA	0	1	1						
TRGA	TRIGS: ORTHOCENTINI AND METRIGNEINI	16	21	20						
CHIT	CHIT: CHITONOMINI	0	1	1						
COLL	FAMILY COLICOPIDAE	0	1	0						
TOHY	FAMILY TOSITICIDAE	420	348	536						
LUMS	FAMILY LUMERICULIDAE	0	1	0						
NATD	FAMILY NATIDAE	0	0	0						

PENTACH DATA SHEET

CATHEDRAL BLUFFS SHALE OIL COMPANY
PISCATAWAY, NEW JERSEY

SAMPLE SITE 1 STEWART STATION

SAMPLE DATE - 3/20/61
NUMBER OF REPLICATES - 3
SAMPLE SIZE - 929.3 CM²

REPLICATE DESIGNATION

A B C

CODE	TAXON	A	B	C
PRYC	BRACHYDONTES	1	4	8
OPTA	OPTATOSERVUS	1	5	10
PHYS	PHYSIDAE	4	7	7
ACAP	ACAPIDAE	2	0	0
BAET	BAETIDAE	8	58	52
TIPS	TRICHOPTERIDAE	0	24	18
HYSP	HYDRUSIDAE	0	4	12
TRIC	TRICHOPTERIDAE	0	6	2
HYTL	HYDROTETIDAE	0	1	1
SIML	SIMULIDAE	0	3	2
NEMA	NEMATODA	0	0	9
OLCP	OLIGONEURIDAE	0	3	3
EPAP	EPIDERMIDAE	0	13	2
ACAB	ACARIDAE	0	1	0
TRIC	TRICHOPTERIDAE	2	3	8
TANI	TANYTARIDAE	0	0	1
TURY	FAMILY THURIDAE	2	4	39
LUMA	FAMILY LUMBRICULIDAE	0	0	1

SAMPLE SITE 2 MIDDLE STATION

SAMPLE DATE - 3/20/61
NUMBER OF REPLICATES - 3
SAMPLE SIZE - 929.3 CM²

REPLICATE DESIGNATION

A B C

CODE	TAXON	A	B	C
PHYS	PHYSIDAE	8	32	11
OLCP	OLIGONEURIDAE	4	0	17
TIPS	TRICHOPTERIDAE	3	12	2
TRIC	TRICHOPTERIDAE	6	56	21
BRYC	BRACHYDONTES	7	40	17
NEMA	NEMATODA	3	20	4
BAET	BAETIDAE	0	0	1
HYSP	HYDRUSIDAE	0	0	2
HYTL	HYDROTETIDAE	0	0	1
TURY	FAMILY THURIDAE	172	576	414
TRIC	TRICHOPTERIDAE	43	96	24

NAID FAMILY NAIDIDAE 1 0 0 0
 CHIT TRIBE CATRONOMINI 1 16 2
 TANI TRIBE TANYTARSINI 0 4 1

SAMPLE SITE: 3 HUNTER STATION

SAMPLE DATE - 072001
 NUMBER OF REPLICATES - 3
 SAMPLE SIZE - 926.0 CM2

REPLICATE DESIGNATION

CODE TAXON A B C

TIPS HEXATOMA LATREILLE 1 2 4
 PHYS PHYSA 1 14 1
 TPIC TRICORYTHIDES 6 43 11
 TIPA TIRULA 2 1 0
 REYC PACHYUS 0 1 0
 OPTI OPTIOSEIDUS 1 3 0
 NEMA PNYLUS NEMATODA 1 1 0
 BAET BAETIS 1 1 0
 AGAB AGABUS 0 1 0
 TRON TRONES ORTHOCLEIDINI AND METRICHEPTINI 5 26 3
 CHIT TRIBE CHIRONOMINI 0 1 1
 TURY FAMILY TURPITIDAE 15 181 17

RENTS DATA SHEET

CATHARAL BLUFFS SHALE OIL COMPANY
PILGRAGE CREEK

SAMPLE SITE: 1 STEWART STATION

SAMPLE DATE - 083163
NUMBER OF REPLICATES - 3
SAMPLE SIZE - 425.0 CM2

CODE TAXON REPLICATE DESIGNATION
A B C

NEPA	PHYLLUM NEMATODA	5	0	0
PRYC	PRYCHUS	0	2	3
OPTI	OPTIOSERVUS	1	1	0
HELI	HELICUS	0	0	1
PHYS	PHYSA	0	2	15
SPPA	SPAREPUM	0	0	1
HYIL	HYLOPOTILA	0	0	1
TUPS	HEXATOMA	0	0	1
ECUP	ECUPYCHUS	0	4	1
SIML	SINGULUM	0	0	1
TRIM	TRIMES ORTHOCCLADINI AND METRIOCNEPTINI	2	0	0
TANT	TANTRE TAGYRANTINI	1	2	15
TUBY	FAMILY TUBIFICIDAE	0	1	0
LUZP	FAMILY LUZEPICULIDAE	94	1	15
		0	0	2

SAMPLE SITE: 2 MIDDLE STATION

SAMPLE DATE - 083163
NUMBER OF REPLICATES - 3
SAMPLE SIZE - 425.0 CM2

CODE TAXON REPLICATE DESIGNATION
A B C

PRYC	PRYCHUS	1	2	0
OPTI	OPTIOSERVUS	0	1	0
NEPA	PHYLLUM NEMATODA	3	1	0
TUBY	FAMILY TUBIFICIDAE	425	372	69
NATD	FAMILY NATIDAE	0	0	0
PHYS	PHYSA	1	0	0
TRIM	TRIMES ORTHOCCLADINI AND METRIOCNEPTINI	2	0	0

SAMPLE SITE: 3 FORTER STATION

SAMPLE DATE - 083163

NUMBER OF REPLICATES - 3
 SAMPLE SITE - 529, 5242

CTD- TACON

REPLICATE DESIGNATION
 A B C

NEMA	PHYLUM NEMATODA	1	0	0
PHYS	PHYSA	11	0	0
HAET	HAETIS	3	0	10
RYC	RYCHUS	1	0	0
OPTI	OPTISERVUS	0	0	2
SIL	SILLUM	2	0	6
TRM	TRMRES OPTHOLADINI AND METRICONEMINI	6	14	13
TARE	TARE TANYTASSINI	0	1	0
CHI	CHIR CATHACMINI	0	0	1
TUAY	FAMILY TUPERICIDAE	33	35	30
NADU	FAMILY NADICAE	1	0	1
LUNR	FAMILY LUNRITULIDAE	2	1	0

GENIUS DATA SHEET

CATHEDRAL HILLS SHALE OIL COMPANY
PICEANCE CREEK

SAMPLE SITE: 1 STEWART STATION

SAMPLE DATE - 00118
NUMBER OF REPLICATES - 3
SAMPLE SIZE - 529.0 CM2

CODE TAXON REPLICATE DESIGNATION
A B C

DIOR	DIORANOTA	12	4	4
OPTI	OPTIOSPERVUS	4	4	4
TRIM	TRIMES ORTHOCLOADINI AND METRICLOADINI	204	12	160
CHIT	TRIRE CHIRONOMINI	16	4	4
TRAC	TRIRE PACHYPTERINI	4	0	0
TIPS	HEXATOMA LATHEVILLE	4	4	4
SIML	SIMULUM	36	12	4
PHYS	PHYSA	20	4	8
RAET	RAETIS	80	8	12
BYC	BYCULIS	4	0	12
MUSC	FAMILY MUSCIDAE	8	0	8
MYIL	HYDROPTILA	4	0	4
TIFA	TIFULA	8	0	4
ISOP	ISOPERLA	12	0	8
MYSP	HYDROPSYCHE	4	0	0
TANT	TRIRE TANTAPSTINI	4	0	4
CHCH	CHEROTRAPS (CHCHOTERPEPS)	4	0	0
TUGY	FAMILY TUGIFICIDAE	72	28	36
NAID	FAMILY NAIDITAE	4	0	0
EPSC	EPHREPELLA (SERRATELLA)	0	4	0
LUB3	FAMILY LUBRICULIDAE	0	4	0
SUCJ	PSEUDOCLEON	0	4	12
CERE	SUPERFAMILY CERATOPOGONINAE	0	0	4

SAMPLE SITE: 2 MIDDLE STATION

SAMPLE DATE - 0021M
NUMBER OF REPLICATES - 3
SAMPLE SIZE - 529.0 CM2

CODE TAXON REPLICATE DESIGNATION
A B C

PHYS	PHYSA	12	8	12
EUPA	EUPHYPHUS	4	0	0
BYC	BYCULIS	4	4	0
OPTI	OPTIOSPERVUS	8	0	0
TIFA	TIFULA	4	8	0
CHIT	TRIRE CHIRONOMINI	8	8	0

MUSC	FAMILY MUSCIDAE	4	0	0
DICR	DICRANOTA	4	0	0
MYIL	MYIOPHILA	44	20	0
TRAM	TRACHELOCLADIINI AND PETIOLENEINI	164	80	84
NAJO	FAMILY NALIDAE	24	20	40
TUUY	FAMILY TUFICIDAE	516	264	256
HAET	HAETUS	24	24	16
LIPH	LIPNEPHILA	12	4	0
ISOP	ISOPHILA	0	4	4
TPIC	TRICHOPTERIDAE	0	4	0
PACR	F-125 MACROPLEPTINI	0	0	4
LUMR	FAMILY LUMERICULIDAE	0	0	8

SAMPLE SITE: 3 HUNTER STATION

SAMPLE DATE - 09/14/1

NUMBER OF REPLICATES - 3

SAMPLE SITE - 524.0 CM2

CODE	TAXON	REPLICATE DESIGNATION		
		A	B	C
PAYS	PHYSA	0	4	2
PHYC	PHYCINUS	4	0	1
TRAM	TRACHELOCLADIINI AND PETIOLENEINI	368	32	190
NAJO	NAJO	12	8	2
CHIT	CHITONIDAE	8	8	2
OPTI	OPTIDAE	8	0	1
TPIC	TRICHOPTERIDAE	24	44	1
TUUY	FAMILY TUFICIDAE	40	8	59
LUMR	FAMILY LUMERICULIDAE	0	4	0

RENIFOS DATA SHEET

CATHEDRAL BLUFFS SHALE OIL COMPANY
PICCEANCE CREEK

SAMPLE SITE: 1 STEWART STATION

SAMPLE DATE - 110481
NUMBER OF PPLICATES - 3
SAMPLER SIZE - 929.0 CM2

CODE TAXON PPLICATE DESIGNATION
A B C

BRYC	BYCHIIUS	8	8	8
SINL	SIMPULIUM	96	56	4
OPTI	OPTIOSERVUS	10	0	5
TRIC	TRICORYTHODES	0	4	2
EUPA	EUPARYPHUS	2	0	2
TANT	TRIPE TANTARSINI	0	0	6
TRIP	TRIPES ORTHOCLADIINI AND METRIOCNEMIINI	76	452	192
TUBS	FAMILY TUBIFICIDAE	126	256	76
DIAS	DIARE DIAPESINI	0	0	2
NAID	FAMILY NAIDIDAE	0	12	0
PHYS	PHYSA	2	4	0
DICR	DICRANOTA	14	8	0
MUSC	FAMILY MUSCIDAE	2	9	0
CHIT	TRIPE CHIRONOMINI	4	12	0
EPSE	EPHEMERELLA (SEBRATELLA)	0	4	0
TIPS	HEXATIPA LATREILLE	2	0	0
ISOP	ISOPARLA	6	0	0
BACT	BAETIS	10	0	0
SUCG	PSEUDOCLOEON	6	0	0
HYSP	HYDROPSYCHE	4	0	0
LUMB	FAMILY LUMBRICULIDAE	4	0	0
TIPA	TIPULA	6	4	6

SAMPLE SITE: 2 MIDDLE STATION

SAMPLE DATE - 110481
NUMBER OF PPLICATES - 3
SAMPLER SIZE - 929.0 CM2

CODE TAXON PPLICATE DESIGNATION
A B C

PHYS	PHYSA	12	0	12
HYTL	HYDROPTILA	0	0	1
TIPA	TIPULA	148	4	16
DICR	DICRANOTA	20	4	44
BRYC	BYCHIIUS	8	4	8
OPTI	OPTIOSERVUS	16	0	16
TRIP	TRIPES ORTHOCLADIINI AND METRIOCNEMIINI	64	68	208

CHIT	TRIBE CHIRONOMINI	0	0	28
MUSC	FAMILY MUSCIDAE	8	0	4
TURY	FAMILY TUBIFICIDAE	964	48	500
LUM	FAMILY LUMBRICULIDAE	12	0	24
CER	SUBFAMILY CERATOPOGONINAE	0	0	4
TANT	TRIBE TANYTARSINI	0	0	4
ISO	ISOPODA	0	4	0
EPSE	EPHEMERA (SERRATELLA)	4	0	0

SAMPLE SITE 3 HUNTER STATION

SAMPLE DATE - 110491
 NUMBER OF REPLICATES - 3
 SAMPLE SIZE - 929.0 CM2

CODE	TAXON	REPLICATE DESIGNATION		
		A	B	C

TRON	TRIBES ORTHOCLOAPIINI AND METRICHNEPINI	7	44	6
SIML	SIMULIUM	0	1	0
TANT	TRIBE TANYTARSINI	1	7	0
CHIT	TRIBE CHIRONOMINI	1	4	4
TRIC	TRICHOPTHOES	0	2	2
TIPS	HEXATOMA LATREILLE	2	1	1
BAET	BAETIS	0	2	0
PROD	TRIBE PYODIAPHESINI	0	4	1
TIPA	TIPULA	1	2	1
HYTL	HYDROPTILA	1	1	2
TURY	FAMILY TUBIFICIDAE	132	240	102
MACR	TRIBE MACROPLEDINI	0	0	1
BYC	BYCHUS	1	0	0

Table 2.5.2-3

PENTHOS (MACROINVERTEBRATES) DENSITY AND DIVERSITY CALCULATIONS

CATHEDRAL BLUFFS SHALE OIL COMPANY
PICEANCE CREEKSTATION NUMBER - 1 STEWART STATION
NUMBER OF REPLICATES - 3
SAMPLE DATE - 052021

TAXON	DENSITY (#/M ²)			PERCENT RELATIVE ABUNDANCE		
	REP 1	REP 2	REP 3	MEAN	S.D.	
PHYLUM NEMATODA	10.8	.0	.0	3.6	6.2	.0
PHYLUM ANNELIDA						
CLASS CLICHOCHAETA						
ORDER HAPLOTAXIDA						
FAMILY TUPIFICIDAE	236.8	258.3	.0	145.1	143.3	1.9
FAMILY LUNARICULIDAE	.0	.0	43.1	14.4	24.9	.2
PHYLUM ARTHROPODA						
CLASS CRUSTACEA						
ORDER AMPHIPODA						
FAMILY GAMMARIDAE						
GAMMARUS LACUSTRIS	10.8	.0	.0	3.6	6.2	.0
CLASS INSECTA						
ORDER EPHEMEROPTERA						
FAMILY BAETIDAE						
BALIC	21.5	43.1	.0	21.5	21.5	.2
FAMILY EPHEMERELLIDAE						
EPHEMERELLA (EPHEMERELLA)	21.5	.0	43.1	21.5	21.5	.2
FAMILY TRICORYTHIDAE						
TRICORYTHIDAE	32.3	86.1	.0	39.5	43.5	.4
ORDER PLECOPTERA						
FAMILY PERLOIDAE						
ISOPELIA	150.7	861.1	129.2	380.3	416.5	4.3
ORDER COLEOPTERA						
FAMILY ELMIDAE						
OPTIOSERVUS	53.8	301.4	.0	118.4	160.7	1.3
FAMILY GYLLISCIDAE						
AGAPUS	10.8	.0	.0	3.6	6.2	.0
ORDER TRICHOPTERA						
FAMILY HYDROPSYCHIDAE						
HYDROPSYCHE	32.3	86.1	86.1	68.2	31.1	.8
FAMILY GLUSSOSOMATIDAE						
GLUSSOSOMA	10.8	.0	.0	3.6	6.2	.0
ORDER DIPTERA						
FAMILY CERATOPOGONIDAE						
SURFAMILY CERATOPOGONINAE	10.8	.0	.0	3.6	6.2	.0
FAMILY CHIRONOMIDAE						
SUBFAMILY TANYPODINAE						
TRIBE TANYPODINI	.0	43.1	.0	14.4	24.9	.2
SUBFAMILY ORTHOCNEMIINAE						
TRIBE ORTHOCNEMIINI	.0	43.1	.0	14.4	24.9	.2
TRIBE ORTHOCNEMIINI	11022.6	7750.3	3875.1	7548.3	3579.0	86.0
SURFAMILY CHIRONOMINAE						
TRIBE CHIRONOMINI	10.8	43.1	.0	17.9	22.4	.2
TRIBE TANYTARSINI	10.8	.0	.0	3.6	6.2	.0
FAMILY TIPULIDAE						
CISPARGIA	32.3	86.1	43.1	53.8	28.5	.6
HEVATICA LATREILLE	172.2	430.6	43.1	215.3	197.3	2.5

TIPULA
FAMILY STRATIOMYIDAE
EUPARYPHUS
53.8 86.1 .0 46.6 43.5 .5
10.8 .0 43.1 17.9 22.4 .2
TOTAL 11916.0 10118.4 4305.7 8780.1 3977.8 100.0

DIVERSITY INDEX CALCULATIONS

SHANNON INDEX - .715
VARIANCE - .0002
MAXIMUM INDEX - 3.091
EVENNESS - .232
NO OF TAXA - 22

STATION NUMBER - 2 MIDDLE STATION
NUMBER OF REPLICATES - 3
SAMPLE DATE - 052881

TAXON	DENSITY (R/M2)			MEAN	S.D.	PERCENT RELATIVE ABUNDANCE
	REP 1	REP 2	REP 3			

PHYLUM ANNELIDA
CLASS OLIGOCHAETA
ORDER HAPLOTAXIDA
FAMILY TUPIPIDIIDAE 1808.4 990.3 1851.5 1550.1 485.2 16.7
FAMILY LUMBRICULIDAE .0 .0 43.1 14.4 24.9 .2
PHYLUM ARTHROPODA
CLASS INSECTA

ORDER EPHEMEROPTERA
FAMILY AETIDAE
BARTIS 172.2 129.2 172.2 157.9 24.9 1.7
FAMILY EPHEMERELEIDAE
OPHIDRELLA (EPHEMERELEA) 86.1 301.4 43.1 143.5 138.4 1.5
FAMILY TETRATHYRIDAE
TRICORYTHIDAE .0 36.1 43.1 43.1 43.1 .5
ORDER PLECOPTERA
FAMILY PERLODIDAE 645.9 86.1 215.3 315.8 293.1 3.4
ISOPLEA
ORDER COLEOPTERA
FAMILY ELPIIDAE 86.1 43.1 .0 43.1 43.1 .5
OPTIDAE
FAMILY DYTISIDAE .0 .0 43.1 14.4 24.9 .2
ACARUS

ORDER TRICHOPTERA
FAMILY LIMNephilidae .0 .0 43.1 14.4 24.9 .2
RESERVOIR
ORDER DIPTERA
FAMILY CEPATOPHOMIDAE 172.2 43.1 43.1 86.1 74.6 .9
SUBFAMILY CEPATOPHOMINAE
FAMILY CHIRONOMIDAE
SUBFAMILY TANYPTINAE
TRIPLE PENTACONTINI .0 .0 .0 14.4 24.9 .2
TANYPTINAE
SUBFAMILY TANYPTINAE .0 .0 43.1 14.4 24.9 .2
TRIPLE PENTACONTINI .0 .0 43.1 14.4 24.9 .2
SUBFAMILY TANYPTINAE

THREE CORYNEMURINI	.0	43.1	43.1	28.7	24.9	.3
TRIBES ORTHOCLADIINI AND METRIONEMINI	5984.9	4477.9	7150.5	5894.5	1359.1	63.4
SUBFAMILY CHIRONOMINAE						
THREE CHIRONOMINI	258.3	387.5	1507.0	717.6	686.7	7.7
THREE TANYTARSINI	43.1	.0	.0	14.4	24.9	.2
FAMILY TIPULIDAE						
DICRANOTA	43.1	172.2	215.3	143.5	89.6	1.5
HEXATOMA	.0	43.1	.0	14.4	24.9	.2
TIPULA	.0	.0	86.1	28.7	49.7	.3
TOTAL	9343.4	6846.1	11668.5	9286.0	2411.7	100.0

DIVERSITY INDEX CALCULATIONS

SHANNON INDEX - 1.323
 VARIANCE - .0002
 MAXIMUM INDEX - 2.596
 EVENNESS - .442
 NO OF TAXA - 20

STATION NUMBER - 3 HUNTER STATION
 NUMBER OF REPLICATES - 3
 SAMPLE DATE - 052861

TAXON	DENSITY (#/M ²)			PERCENT RELATIVE ABUNDANCE		
	REP 1	REP 2	REP 3	MEAN	S.D.	
PHYLUM ANNELIDA						
CLASS OLIGOCHAETA						
ORDER HAPLOTAXIDA						
FAMILY TURFIDICIDAE						25.6
PHYLUM APHRODIZIA	2152.9	3573.7	2712.6	2813.1	715.7	
CLASS CRUSTACEA						
ORDER AMPHIPODA						
FAMILY TALITRIDAE	.0	43.1	.0	14.4	24.9	.1
HYALELLA AZTECA						
CLASS INSECTA						
ORDER EPHEMEROPTERA						
FAMILY RATTIDAE						
BAETIS	215.3	172.2	215.3	200.9	24.9	1.8
FAMILY EPHEMERELLIDAE						
EPHEMERELLA (EPHEMERELLA)	397.5	430.6	732.0	516.7	187.7	4.7
FAMILY TRICORYTHIDAE						
TRICORYTHIDS	473.6	904.2	950.3	789.4	276.8	7.2
ORDER PLECOPTERA						
FAMILY PERLOCTIDAE						
ISOPERLA	43.1	43.1	43.1	43.1	.0	.4
ORDER COLEOPTERA						
FAMILY ELMIIDAE						
OPTIDSERVUS	43.1	43.1	129.2	71.8	49.7	.7
ORDER DIPTERA						
FAMILY CECIDOPOGONIDAE						
CECIDOPOGONINAE	.0	43.1	43.1	28.7	24.9	.3
FAMILY CHIRONOMIDAE						
SUBFAMILY TANYPODINAE						
THREE TANYPODINI	43.1	.0	86.1	43.1	43.1	.4

SUBFAMILY DIAPESINAE	86.1	86.1	215.3	129.2	74.6	1.2
TRIBE PRODIAPESINI						
SUBFAMILY ORTHOCLADIINAE	3143.2	3659.8	5812.7	4205.2	1415.9	38.2
TRIBES ORTHOCLADIINI AND METRICCNEMIINI						
SUBFAMILY CHIRODOPINAE	1679.2	1377.8	3057.1	2038.0	895.3	18.5
TRIBE CHIRONOMINI	.0	43.1	.0	14.4	24.9	.1
TRIBE TANYTARSINI						
FAMILY TIPULIDAE						
MEYATOMA LATREILLE	129.2	86.1	43.1	86.1	43.1	.9
TIPULA	43.1	.0	.0	14.4	24.9	.1
TOTAL	8439.2	10505.9	14079.7	11006.3	2953.6	100.0

----- DIVERSITY INDEX CALCULATIONS -----

SHANNON INDEX - 1.042
 VARIANCE - .0001
 MAXIMUM INDEX - 2.705
 EVENNESS - .606
 NO OF TAXA - 15

BENTHOS (MACROINVERTEBRATES) DENSITY AND DIVERSITY CALCULATIONS

CATHEDRAL PLUFFS SHALE OIL COMPANY
PISCANCE CREEK

STATION NUMBER - 1 STEWART STATION
NUMBER OF REPLICATES - 3
SAMPLE DATE - 043081

TAXON	DENSITY (#/M ²)				PERCENT	
	REP 1	REP 2	REP 3	MEAN	S.D.	RELATIVE ABUNDANCE
PHYLUM NEMATODA	.0	32.3	10.8	14.4	16.4	.9
PHYLUM ANNELIDA						
CLASS OLIGOCHAETA						
ORDER HAPLOTAXIDA						
FAMILY TUBIFICIDAE	505.9	1377.8	150.7	678.1	631.4	44.5
FAMILY LUMBRICULIDAE	10.8	.0	.0	3.6	6.2	.2
PHYLUM ARTHROPODA						
CLASS CRUSTACEA						
ORDER AMPHIPODA						
FAMILY GAMMARIDAE	.0	10.8	.0	3.6	6.2	.2
GAMMARUS LACUSTRIS						
CLASS INSECTA						
ORDER EPHEMEROPTERA						
FAMILY BAETIDAE	118.4	64.6	86.1	89.7	27.1	5.9
BAETIS						
ORDER COLEOPTERA						
FAMILY ELMIIDAE	21.5	10.8	32.3	21.5	10.8	1.4
OPTIOSERVUS						
FAMILY DYTISCIDAE	10.8	10.8	21.5	14.4	6.2	.9
AGAPUS						
ORDER TRICHOPTERA						
FAMILY HYDROPSYCHIDAE	10.8	.0	10.8	7.2	6.2	.5
HYDROPSYCHE						
ORDER DIPTERA						
FAMILY CEPATOPOGONIDAE	.0	10.8	21.5	10.8	10.8	.7
SUBFAMILY CERATOPOGONINAE						
FAMILY CHIRONOMIDAE	.0	10.8	.0	3.6	6.2	.2
SUBFAMILY DIAPYCNINAE						
TIPULAE PRODIAMESINAE						
SUBFAMILY DITHOCLADINAE						
TRIBE DITHOCLADINI (AND) METRIDIENINAE	161.5	742.7	882.7	595.6	382.4	39.1
SUBFAMILY CHIRONOMINAE						
TRIBE CHIRONOMINI	.0	10.8	.0	3.6	6.2	.2
FAMILY TIPULIDAE						
DICRANGOTA	.0	10.8	.0	3.6	6.2	.2
HEXATOPA LATRETTILLE	64.6	86.1	10.8	53.8	38.8	3.5
TIPULA	21.5	21.5	.0	14.4	12.4	.9
PHYLUM MOLLUSCA						
CLASS GASTROPODA						
ORDER BASSEMATOPHORA						
FAMILY PHYSIDAE						
PHYSA						
TOTAL	947.3	2400.4	1227.1	1524.9	771.0	100.0

DIVERSITY INDEX CALCULATIONS

SHANNON INDEX - 1.361
 VARIANCE - .0009
 MAXIMUM INDEX - 2.773
 EVENNESS - .491
 NO OF TAXA - 16

STATION NUMBER - 2 MIDDLE STATION
 NUMBER OF REPLICATES - 3
 SAMPLE DATE - 063081

TAXON	REP 1	DENSITY (1/M2) REP 2	Q(P 3	MEAN	S.D.	PERCENT RELATIVE ABUNDANCE
PHYLUM NEMATODA	.0	10.8	.0	3.6	6.2	.0
PHYLUM ANNELIDA						
CLASS POLYCHAETA						
ORDER HAPLOTAXIDA						
FAMILY TUBIFICIDAE	12142.1	5769.6	6630.8	8180.8	3457.5	97.1
PHYLUM ARTHROPODA						
CLASS INSECTA						
ORDER EPHEMEROPTERA						
FAMILY TRICORYTHIDAE	.0	21.5	10.8	10.8	10.6	.1
TRICORYTHIDAE						
ORDER COLEOPTERA						
FAMILY DYTISCIDAE	.0	71.5	.0	7.2	12.4	.1
AGABUS						
ORDER DIPTERA						
FAMILY CERATOPOGONIDAE						
SUBFAMILY CERATOPOGONINAE	.0	.0	10.8	3.6	6.2	.0
FAMILY CHIRONOMIDAE						
SUBFAMILY ORTHOCLAINIAE						
TRIBE ORTHOCLAINIINI	259.3	150.7	139.9	193.0	65.5	2.2
SUBFAMILY CHIRONOMINAE						
TRIBE CHIRONOMINI	.0	.0	10.8	3.6	6.2	.0
FAMILY PUSILLAE	.0	10.8	.0	3.6	6.2	.0
FAMILY TIPULIDAE						
TRIBE TIPULINI	43.1	10.8	.0	17.9	22.4	.2
PHYLUM MOLLUSCA	.0	10.8	.0	3.6	6.2	.0
CLASS GASTROPODA						
ORDER BASIDIOMYXOPHORA						
FAMILY PHYSIDAE	.0	10.8	.0	3.6	6.2	.0
PHYSA						
TOTAL	12443.5	6017.2	6903.0	8421.2	3505.5	100.0

DIVERSITY INDEX CALCULATIONS

SHANNON INDEX - .159
 VARIANCE - .0001
 MAXIMUM INDEX - 2.338
 EVENNESS - .646
 NO OF TAXA - 11

STATION NUMBER - 3 MOUNT STATION
 NUMBER OF REPLICATES - 3
 SAMPLE DATE - 063081

TAXON	DENSITY (#/M ²)			MEAN	S.D.	PERCENT RELATIVE ABUNDANCE
	REP 1	REP 2	REP 3			
PHYLUM ANNELIDA						
CLASS OLIGOCHAETA						
ORDER HAPLOTAXIDA						
FAMILY TURRICULIDAE	4521.0	3746.0	5769.6	4678.9	1021.0	90.4
FAMILY LUMBRICULIDAE	.0	10.8	.0	3.6	6.2	.1
FAMILY ALBIDINAE	.0	.0	66.1	28.7	49.7	.6
PHYLUM ARTHROPODA						
CLASS INSECTA						
ORDER EPHEMEROPTERA						
FAMILY TRICRYTHIDAE	75.3	193.0	139.9	132.8	54.2	2.6
TRICRYTHIDAE						
ORDER COLEOPTERA						
FAMILY HYDROPHILIDAE	10.8	21.5	10.8	14.4	6.2	.3
HYDROPHILUS						
FAMILY DYTISCIDAE	.0	10.8	.0	3.6	6.2	.1
DYTISCIDAE	.0	10.8	.0	3.6	6.2	.1
ORDER DIPTERA						
FAMILY CHIRONOMIDAE	193.8	226.0	215.3	211.7	16.4	4.1
SUBFAMILY CHIRONOMINAE						
TRIBE CHIRONOMINI AND METRICNEMINI	.0	10.8	10.8	7.2	6.2	.1
CHIRONOMINI	.0	10.8	.0	3.6	6.2	.1
FAMILY MUSCIDAE	.0	.0	10.8	3.6	6.2	.1
FAMILY TIPULIDAE	43.1	64.6	118.4	75.3	33.8	1.5
HEXATOMA LATREILLE	10.8	.0	10.8	7.2	6.2	.1
TIPULA						
PHYLUM MOLLUSCA						
CLASS GASTROPODA						
ORDER BASIPIATOPHORA						
FAMILY PHYSIDAE	.0	10.8	.0	3.6	6.2	.1
PHYSA						
TOTAL	4854.7	4305.7	6372.4	5177.6	1070.5	100.0

DIVERSITY INDEX CALCULATIONS

SHANNON INDEX - .471
 VARIANCE - .0003
 MAXIMUM INDEX - 2.634
 EVENNESS - .179
 NO OF TAXA - 14

BENTHOS (MACROINVERTEBRATES) DENSITY AND DIVERSITY CALCULATIONS

CATHEDRAL BLUFFS SHALE OIL COMPANY
PICCANNE CREEK

STATION NUMBER - 1 STEWART STATION
NUMBER OF REPLICATES - 3
SAMPLE DATE - 073081

TAXON	DENSITY (#/M2)			PERCENT		
	REP 1	REP 2	REP 3	MEAN	S.D.	RELATIVE ABUNDANCE
PHYLUM NEMATODA						
PHYLUM ANNELIDA						
CLASS OLIGUCHAETA						
ORDER HAPLOTAXIOA						
FAMILY TURRICIDAE	21.5	43.1	419.8	161.5	224.0	13.7
FAMILY LUMBRICULIDAE	.0	.0	10.8	3.6	6.2	.3
PHYLUM ARTHROPODA						
CLASS ARACHNIDA						
ACARINA	21.5	.0	.0	7.2	12.4	.6
CLASS INSECTA						
ORDER EPHEMEROPTERA						
FAMILY BARTICAE						
BARTIS	86.1	624.3	559.7	423.4	293.9	36.0
FAMILY TRICORYTHIDAE						
TRICORYTHIDAE	.0	64.6	21.5	28.7	32.9	2.4
ORDER COLEOPTERA						
FAMILY ELMIIDAE						
ELMIIDAE	10.8	51.9	107.6	57.4	48.5	4.9
FAMILY MALPILIDAE						
MALPILIDAE	10.8	43.1	86.1	46.6	37.8	4.0
FAMILY DYTISCIDAE						
DYTISCIDAE	.0	10.8	.0	3.6	6.2	.3
ORDER TRICHOPTERA						
FAMILY HYALOPSYCHIDAE						
HYALOPSYCHIDAE	.0	43.1	129.2	57.4	65.8	4.9
FAMILY HYDROTILIDAE						
HYDROTILIDAE	.0	10.8	10.8	7.2	6.2	.6
ORDER DIPTERA						
FAMILY CHIRONOMIDAE						
SUBFAMILY ORTHOCLOADINI	21.5	32.3	66.1	46.6	34.6	4.0
SUBFAMILY CHIRONOMINI						
CHIRONOMINI	.0	.0	10.8	3.6	6.2	.3
FAMILY EPTEROPTERIDAE	.0	139.9	21.5	53.8	75.3	4.6
FAMILY SIMULIIDAE						
SIMULIIDAE	.0	.0	21.5	7.2	12.4	.6
FAMILY TIPULIDAE						
TIPULIDAE	.0	32.3	32.3	21.5	18.6	1.8
PHYLUM MOLLUSCA						
CLASS GASTROPODA	.0	258.3	193.8	150.7	134.4	12.9
ORDER BASIDIOMYOPHORA						
FAMILY PHYSIDAE	43.1	75.3	75.3	64.6	18.6	5.5
TOTAL	215.3	1431.6	1981.7	1176.9	862.9	100.0

DIVERSITY INDEX CALCULATIONS

SHANNON INDEX - 2.163
 VARIANCE - .0010
 MAXIMUM INDEX - 2.890
 EVENNESS - .741
 NO OF TAXA - 14

STATION NUMBER - 2 MIDDLE STATION
 NUMBER OF EFFPLICATES - 3
 SAMPLE DATE - 073081

TAXON	DENSITY (#/M ²)			PERCENT		
	REP 1	REP 2	REP 3	MEAN	S.D.	RELATIVE ABUNDANCE
PHYLUM NEMATODA	32.3	215.3	43.1	96.9	102.7	1.7
PHYLUM ANNELIDA						
CLASS OLIGOCHAETA						
ORDER HAPLOTAXIDA						
FAMILY TRICORYTHIDAE	1851.5	6200.2	4456.4	4169.4	2189.5	72.3
FAMILY NAIDIDAE	10.8	.0	.0	3.6	6.2	.1
PHYLUM ARTHROPODA						
CLASS CRUSTACEA						
ORDER AMPHIPODA						
FAMILY TALITRIDAE	.0	.0	10.8	3.6	6.2	.1
HYALELLA AZTECA						
CLASS INSECTA						
ORDER PTICOMORPHA						
FAMILY HAETIDAE	.0	.0	10.8	3.6	6.2	.1
BAETIS						
FAMILY TRICORYTHIDAE	64.6	602.8	276.0	297.8	276.2	5.2
TRICORYTHIDAE						
ORDER COLEOPTERA						
FAMILY MALLOPHAGAE	75.3	430.6	183.0	229.6	187.1	4.0
PSYCHUS						
ORDER TRICHOPTERA						
FAMILY HYDROPSYCHIDAE	.0	.0	21.5	7.2	12.4	.1
HYDROPSYCHE						
ORDER DIPTERA						
FAMILY CHIRONOMIDAE						
SURFAMILY ORTHOCLEADINAE	462.9	1033.4	258.3	584.9	401.7	10.1
TRIBE ORTHOCLEADINI AND METRICHEMINI						
SURFAMILY CHIRONOMINAE	10.8	172.2	21.5	68.2	90.3	1.2
TRIBE CHIRONOMINI	.0	43.1	10.8	17.9	22.4	.3
TRIBE TANYTARINI						
FAMILY TIPULIDAE	43.1	.0	75.3	39.5	37.8	.7
DICRANOTA	32.3	129.2	21.5	61.0	59.3	1.1
HEMATOPHA						
LATRELLIE						
PHYLUM MOLLUSCA						
CLASS GASTROPODA						
ORDER BASIPHATOPHORA	36.1	344.5	118.4	183.0	140.9	3.2
FAMILY PHYSIDAE						
PHYSA						
TOTAL	2662.5	9171.2	5457.5	5766.1	3261.8	100.0

DIVERSITY INDEX CALCULATIONS

SHANNON INDEX - 1.101
 VARIANCE - .0003
 MAXIMUM INDEX - 2.639
 EVENNESS - .417
 NO OF TAXA - 14

STATION NUMBER - 3 HUNTER STATION
 NUMBER OF REPLICATES - 3
 SAMPLE DATE - 073081

TAXON	DENSITY (#/M ²)			MEAN	S.D.	PERCENT RELATIVE ABUNDANCE
	REP 1	REP 2	REP 3			
PHYLUM NEMATODA	10.8	10.8	.0	7.2	6.2	.6
PHYLUM ANNELIDA						
CLASS JULIOCHAETA						
ORDER HAPLOTAXIDA						
FAMILY TUBIFICIDAE	161.5	1948.3	183.0	764.3	1025.5	61.0
PHYLUM ARTHROPODA						
CLASS INSECTA						
ORDER EPHEMEROPTERA						
FAMILY BAETIDAE						
FAMILY TRICORYTHIDAE	10.8	10.8	.0	7.2	6.2	.6
TALICIDAE						
ORDER COLEOPTERA	64.6	484.4	118.4	222.5	228.4	17.8
FAMILY ELPIDAE						
GENUS						
FAMILY MELIPIDAE	10.8	32.3	.0	14.4	16.4	1.1
BYCHUS	.0	10.8	.0	3.6	6.2	.3
FAMILY DYTISCIDAE	.0	10.8	.0	3.6	6.2	.3
ACAPUS						
ORDER DIPTERA						
FAMILY CHIRONOMIDAE						
SUBFAMILY ORTHOCLOADINAE	53.8	301.4	22.3	129.2	149.5	10.3
TRIAES ORTHOCLOADINI AND METRIDONETINI						
SUBFAMILY CHIRONOMINAE	.0	10.8	10.8	7.2	6.2	.6
TRIAE CHIRONOMINI						
FAMILY TIPULIDAE	10.8	21.5	43.1	25.1	16.4	2.0
HEXAICA LATREILLE	21.5	10.8	.0	10.8	10.8	.9
TIPULA						
PHYLUM MOLUSCA						
CLASS GASTROPODA						
ORDER BASIDIOMYXOPHORA						
FAMILY PHYSIDAE	10.8	150.7	10.8	57.4	80.8	4.6
PHYSA						
TOTAL	355.2	3003.2	350.3	1252.2	1516.6	100.0

DIVERSITY INDEX CALCULATIONS

SHANNON INDEX - 1.277

VARIANCE - .0011
PAYROLL INDEX - 2.445
EVENNESS - .514
NO OF TAXA - 12

BENTHOS (MACROINVERTEBRATES) DENSITY AND DIVERSITY CALCULATIONS

CATHEDRAL PLUFFS SHALE OIL COMPANY
PICEANCE CREEK

STATION NUMBER - 1 STEWART STATION
NUMBER OF REPLICATES - 3
SAMPLE DATE - 033181

TAXON	DENSITY (#/M ²)				PERCENT	
	REP 1	REP 2	REP 3	MEAN	S.D.	RELATIVE ABUNDANCE
PHYLUM NEMATODA	53.8	.0	.0	17.9	31.1	2.9
PHYLUM ANNELIDA						
CLASS OLIIGOCHAETA						
ORDER HAPLOTAXIDA						
FAMILY TUBIFICIDAE	1011.8	10.8	161.5	394.7	533.8	64.0
FAMILY LUMBRICULIDAE	.0	.0	21.5	7.2	32.4	1.2
PHYLUM ARTHROPODA						
CLASS INSECTA						
ORDER COLEOPTERA						
FAMILY DRYOPIDAE	.0	.0	10.8	3.6	6.2	.6
HELICUS						
FAMILY ELPIDAE						
LPTIGERARUS	10.8	10.8	.0	7.2	6.2	1.2
FAMILY HALPILIDAE						
BYCHUS	.0	21.5	32.3	17.9	16.4	2.9
ORDER TRICHOPTERA						
FAMILY HYDROPTILIDAE	.0	.0	10.8	3.6	6.2	.6
HYDROPTILA						
ORDER DIPTERA						
FAMILY CHIRONOMIDAE						
SUBFAMILY ORTHOCLOADINAE						
TRIBE ORTHOCLOADINI AND METROCLADINI	10.8	21.5	161.5	64.6	84.1	10.5
SUBFAMILY CHIRONOMINAE						
TRIBE TANYTARSINI	.0	10.8	.0	3.6	6.2	.6
FAMILY SIMULIDAE						
SIMULUM	21.5	.0	.0	7.2	12.4	1.2
FAMILY TIPULIDAE						
HEMATOMA LATREILLI	.0	43.1	10.8	17.9	22.4	2.9
FAMILY STRATIOMYIDAE						
ELDERPHUS	.0	.0	10.8	3.6	6.2	.6
PHYLUM MOLLUSCA						
CLASS GASTROPODA						
ORDER ASCUSMATOPHORA						
FAMILY PHYSICAE						
OMYSA						
CLASS BIVALVIA						
ORDER MYTIDODONTA						
FAMILY SPHAERIIDAE	.0	.0	10.8	3.6	6.2	.6
SPHAERIUM						
TOTAL	1100.7	139.9	602.8	617.2	484.6	100.0

DIVERSITY INDEX CALCULATIONS

SHANLON INDEX - 1.372

VARIANCE - .0030
 MAXIMUM INDEX - 2.639
 EVENNESS - .520
 NO OF TAXA - 14

STATION NUMBER - 2 MIDDLE STATION
 NUMBER OF REPLICATES - 3
 SAMPLE DATE - 08/31/61

TAXON	DENSITY (#/M ²)			MEAN	S.D.	PERCENT RELATIVE ABUNDANCE
	REP 1	REP 2	REP 3			
PHYLUM NEMATODA	32.3	10.8	.0	14.4	16.4	.5
PHYLUM ANNELIDA						
CLASS OLIGOCHAETA						
ORDER HAPLOTAXIDA						
FAMILY TUPIFICIDAE	4574.8	4004.3	732.0	3103.7	2073.7	97.9
FAMILY NAUJIDAE	.0	86.1	.0	28.7	49.7	.9
PHYLUM ARTHROPODA						
CLASS INSECTA						
ORDER COLEOPTERA						
FAMILY ELMIIDAE	.0	10.8	.0	3.6	6.2	.1
FAMILY HALIPLIDAE	10.8	21.5	.0	10.8	10.8	.3
ORDER DIPTERA						
SUBFAMILY ORTHOCLEPTINAE						
TIPIDAE ORTHOCLEPTINI AND METRIOCENINI	21.5	.0	.0	7.2	12.4	.2
PHYLUM MOLLUSCA						
CLASS GASTROPODA						
ORDER BASIDIOMYXOPHORA						
FAMILY PHYSIDAE	10.8	.0	.0	3.6	6.2	.1
PHYSA						
TOTAL	4650.2	4133.5	732.0	3171.9	2128.7	100.0

DIVERSITY INDEX CALCULATIONS

SHANNON INDEX - .137
 VARIANCE - .0002
 MAXIMUM INDEX - 1.646
 EVENNESS - .070
 NO OF TAXA - 7

STATION NUMBER - 3 HUNTER STATION
 NUMBER OF REPLICATES - 3
 SAMPLE DATE - 08/31/61

TAXON	DENSITY (#/M ²)			MEAN	S.D.	PERCENT RELATIVE ABUNDANCE
	REP 1	REP 2	REP 3			

PHYLUM NEMATODA	10.8	.0	.0	3.6	6.2	.5
PHYLUM ANNELIDA						
CLASS OLIGONEURATA						
ORDER HEMITAXIDA						
FAMILY TURRICIDAE	355.2	376.7	387.5	373.2	16.4	54.5
FAMILY LUMBRICIDAE	.0	10.8	.0	2.6	6.2	.5
FAMILY HAUDIDAE	10.8	.0	10.8	7.2	6.2	1.0
PHYLUM ARTHROPODA						
CLASS INSECTA						
ORDER EPHEMEROPTERA						
FAMILY HALIIDAE	32.3	.0	107.6	46.6	55.2	6.8
BETIS						
ORDER COLEOPTERA						
FAMILY ELVIDAE	.0	.0	21.5	7.2	12.4	1.0
PTIOSERVUS						
FAMILY HALIIDAE	10.8	.0	.0	3.6	6.2	.5
BYCHUS						
ORDER DIPTERA						
FAMILY CHIRONOMIDAE						
SUBFAMILY ORTHOCLEADINAE	96.1	204.5	139.9	143.5	59.3	20.9
TRIBES ORTHOCLEADINI AND METROCNEMINI						
SUBFAMILY CHIRONOMINAE	.0	.0	10.8	3.6	6.2	.5
TRIBE CHIRONOMINI	.0	10.8	.0	3.6	6.2	.5
TRIBE TANYTARINI						
FAMILY SIMULIDAE	21.5	.0	44.6	28.7	32.9	4.2
SIMULIUM						
PHYLUM MOLLUSCA						
CLASS GASTROPODA						
ORDER BASIDIOPHORA						
FAMILY PHYSIDAE	118.4	.0	64.6	61.0	59.3	8.9
PHYSA						
TOTAL	645.9	602.8	807.3	685.3	107.8	100.0

DIVERSITY INDEX CALCULATIONS

SHANNON INDEX - 1.422
VARIANCE - .0319
MAXIMUM INDEX - 2.455
EVENNESS - .572
NO OF TAXA - 12

BENTHOS (MACROINVERTEBRATES) DENSITY AND DIVERSITY CALCULATIONS

CATHARAL BLUFFS SHALE OIL COMPANY
PICEANCE CR-10K

STATION NUMBER - 1 STEWART STATION
NUMBER OF REPLICATES - 3
SAMPLE DATE - 093191

TAXON	REP 1	DENSITY (#/M2) REP 2	REP 3	MEAN	S.D.	PERCENT RELATIVE ABUNDANCE
PHYLUM ANNELIDA						
CLASS OLIGOCHAETA						
ORDER HAPLOCLADIA						
FAMILY TUBIFICIDAE	775.0	301.4	367.5	480.0	252.3	15.3
FAMILY LUMBRICULIDAE	.0	43.1	.0	14.4	24.9	.5
FAMILY NAIDIDAE	43.1	.0	.0	14.4	24.9	.5
PHYLUM APHRODISIDA						
CLASS INSECTA						
ORDER EPHEMEROPTERA						
FAMILY BAETIDAE						
BAETIS	661.1	86.1	129.2	358.8	435.6	11.3
PSEUDOCLEON	.0	43.1	129.2	57.4	65.8	1.8
FAMILY PHLEMERELLIDAE						
EPHEMERELLA (SERRATELLA)	.0	43.1	.0	14.4	24.9	.5
FAMILY LEPTOPHELIIDAE						
CHOROTERPS (CHOROTERPS)	43.1	.0	.0	14.4	24.9	.5
ORDER PLACODOPTERA						
FAMILY PERLOIDAE						
ISOPODA	129.2	.0	86.1	71.8	65.8	2.3
ORDER COLEOPTERA						
FAMILY ELMIDAE						
OPTIOSCIVUS	43.1	43.1	43.1	43.1	.0	1.4
FAMILY HALIPTIDAE						
BYCHMIUS	43.1	.0	129.2	57.4	65.8	1.8
ORDER TRICHOPTERA						
FAMILY HYDROPSYCHIDAE						
HYDROPSYCHE	43.1	.0	.0	14.4	24.9	.5
FAMILY HYDROPTILIDAE						
HYDROPTILA	43.1	.0	43.1	28.7	24.9	.9
ORDER DIPTERA						
FAMILY CECATOPOGONIDAE						
SUBFAMILY CECATOPOGONINAE	.0	.0	43.1	14.4	24.9	.5
FAMILY CHIRONOMIDAE						
SUBFAMILY TANYPOGINAE						
TRIBE TANYPOGININI	43.1	.0	.0	14.4	24.9	.5
SUBFAMILY ORTHOCLOADINAE						
TRIBES ORTHOCLOADININI (AN) METRICNEMINI	2195.9	129.2	1722.3	1346.1	1082.7	42.3
SUBFAMILY CHIRONOMINAE						
TRIBE CHIRONOMINI	172.2	43.1	43.1	86.1	74.6	2.7
TRIBE TANYTARSINI	43.1	.0	43.1	28.7	24.9	.9
FAMILY SIMULIIDAE						
SIMULIUM	387.5	129.2	43.1	186.6	179.3	5.9
FAMILY MUSCIDAE	86.1	.0	66.1	57.4	49.7	1.8
FAMILY TIPULIDAE						
PICRANOTA	129.2	43.1	43.1	71.8	42.7	2.3
HEXATEUCHA	43.1	43.1	43.1	43.1	.0	1.4
TIPULA	86.1	.0	43.1	42.1	43.1	1.4

PHYLUM MOLLUSCA
CLASS GASTROPODA
ORDER BASMATOPHORA
FAMILY PHYSIDAE
PHYSA

215.3 43.1 66.1 114.8 89.6 3.6
5425.2 990.3 3143.2 3186.2 2217.0 100.0

TOTAL

DIVERSITY INDEX CALCULATIONS

SHANNON INDEX - 2.008
VARIANCE - .0006
MAXIMUM INDEX - 3.135
EVENNESS - .669
NO OF TAXA - 23

STATION NUMBER - 2 MIDDLE STATION

NUMBER OF REPLICATES - 3
SAMPLE DATE - 093181

TAXON	REP 1	REP 2	REP 3	MEAN	S.D.	PERCENT RELATIVE ABUNDANCE
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PHYLUM ANNELIDA

CLASS OLIGOCHAETA

ORDER HABUTAXIDA

FAMILY TURRICULIDAE

FAMILY LUPRICULIDAE

FAMILY NAIDIDAE

PHYLUM ARTHROPODA

CLASS INSECTA

ORDER EPHEMEROPTERA

FAMILY BAETIDAE

BAETIS

FAMILY TRICORYTHIDAE

TRICORYTHIDAE

ORDER PLECOPTERA

FAMILY PLECOPTIDAE

ISOPODA

ORDER COLEOPTERA

FAMILY CURCULIONIDAE

OPTIOSERVUS

FAMILY HALIPTIDAE

BYRRHINUS

ORDER TRICHOPTERA

FAMILY HYDROPTILIDAE

HYDROPTILA

ORDER DIPTERA

FAMILY CHIRONOMIDAE

SUBFAMILY TANYPODINAE

TRIBE PACIPLIDINAE

SUBFAMILY OTHINCLADINAE

TRIBE OTHINCLADINAE

SUBFAMILY COIPOPODINAE

TRIBE CHIRONOMIDINAE

FAMILY MUSCIDAE

FAMILY TIPULIDAE

DISPARA 43.1 .0 14.4 24.9 .2
 LINDPHILA 129.2 43.1 .0 57.4 65.8 .9
 TIPULA 43.1 .0 43.1 43.1 .7
 FAMILY STRATIOMYIDAE
 RUDAKYPUS 43.1 .0 14.4 24.9 .2

PHYLUM MOLLUSCA
 CLASS GASTROPODA
 ORDER BASSCMATOPHORA
 FAMILY PHYSIDAE
 PHYSA

TOTAL 129.2 86.1 129.2 114.9 24.9 1.4
 8994.9 5984.9 4564.0 6516.0 2264.6 100.0

DIVERSITY INDEX CALCULATIONS

SHANNON INDEX - 1.339
 VARIANCE - .0003
 MAXIMUM INDEX - 2.830
 EVENNESS - .463
 NO OF TAXA - 18

STATION NUMBER - 3 HUNTER STATION
 NUMBER OF REPLICATES - 3
 SAMPLE DATE - 03161

TAXON DENSITY (N/M2) REP 1 REP 2 REP 3 MEAN S.D. PERCENT RELATIVE ABUNDANCE

PHYLUM ANNELIDA

CLASS OLIGOCHAETA
 ORDER HAPLOTAXIDA
 FAMILY TUBIFICIDAE
 FAMILY LUMBRICULIDAE

PHYLUM ARTHROPODA
 CLASS INSECTA

ORDER PHLEBOTOMERA
 FAMILY TRICORYTHIDAE

ORDER COLEOPTERA
 FAMILY ELMIDAE

ORDER DIPTERA
 FAMILY HALIPLIDAE

ORDER DIPTERA
 FAMILY CHIRONOMIDAE

SUBFAMILY CHIRONOMINI
 TRIBE CHIRONOMINI

TRIBE TANYTARSINI
 PHYLUM MOLLUSCA

CLASS GASTROPODA
 ORDER BASSCMATOPHORA

FAMILY PHYSIDAE
 PHYSA

TOTAL

5855.8 1162.5 2777.2 3265.2 2384.4

100.0

DIVERSITY INDEX CALCULATIONS

SHANNON INDEX - 1.096
VARIANCE - .0004
MAXIMUM INDEX - 2.197
EVENNESS - .499
NO OF TAXA - 9

BENTHOS (MACROINVERTEBRATES) DENSITY AND DIVERSITY CALCULATIONS

CATHLAMET RUFFES SHALE OIL COMPANY
PICEANCE CREEK

STATION NUMBER - 1 STEWART STATION
NUMBER OF REPLICATES - 3
SAMPLE DATE - 11/04/81

TAXON	DENSITY (#/M ²)			MEAN	S.D.	PERCENT RELATIVE ABUNDANCE
	REP 1	REP 2	REP 3			
PHYLUM ANNELIDA						
CLASS OLIGOCHEATA						
ORDER HAPLOTAXIDA						
FAMILY TUBIFICIDAE	1377.8	2755.7	818.1	1650.5	997.2	30.4
FAMILY LUMBRICULIDAE	43.1	.0	.0	14.4	24.9	.3
FAMILY NAIADIDAE	.0	129.2	.0	43.1	74.6	.8
PHYLUM ARTHROPODA						
CLASS INSECTA						
ORDER EPHEMEROPTERA						
FAMILY BAETIDAE						
BAETIS	107.6	.0	.0	35.9	62.1	.7
PSEUDOCHEILON	54.6	.0	.0	21.5	37.3	.4
FAMILY EPHMERELLIDAE						
EPHEMERELLA (SERGATELLA)	.0	43.1	.0	14.4	24.9	.3
FAMILY TRICORYTHIDAE						
TRICORYTHODES	.0	43.1	21.5	21.5	21.5	.4
ORDER COLEOPTERA						
FAMILY PERLIDIDAE						
ISOPERLA	66.6	.0	.0	21.5	37.3	.4
ORDER COLEOPTERA						
FAMILY ELMIIDAE	107.6	.0	53.8	53.8	53.8	1.0
OPTIOSERVUS						
FAMILY MALLOPHIDAE	96.1	86.1	86.1	86.1	.0	1.6
BRACHYUS						
ORDER TRICHOPTERA						
FAMILY HYDROPSYCHIDAE	43.1	.0	.0	14.4	24.9	.3
HYDROPSYCHE						
ORDER DIPTERA						
FAMILY CHIRONOMIDAE						
SUBFAMILY DIAMUSINAE						
TRIBE DIAMUSINI	.0	.0	21.5	7.2	12.4	.1
SUBFAMILY OTHOCLOADINAE						
TRIBES OTHOCLOADINI AND METRIONEMINI	813.1	4865.4	2066.7	2583.4	2072.6	47.5
SUBFAMILY CHIRONOMINAE						
TRIBE CHIRONOMINI	66.6	129.2	.0	64.6	64.6	1.2
TRIBE TANYTAPSIINI	.0	.0	64.6	21.5	37.3	.4
FAMILY SIMULIDAE						
SIMULIUM	1033.4	602.8	64.6	566.9	485.4	10.4
FAMILY MUSCIDAE	21.5	96.1	.0	35.9	44.8	.7
FAMILY TIBULIDAE						
DICPANDIA	150.7	86.1	.0	78.9	75.6	1.5
HEPATIGRA	21.5	.0	.0	7.2	12.4	.1
LATREVILLE	54.6	43.1	64.6	57.4	12.4	1.1
FAMILY STRATIOMYIDAE						
EUPATYRPHUS	21.5	.0	21.5	14.4	12.4	.3
PHYLUM MOLLUSCA						
CLASS GASTROPODA						

21.5	43.1	.0	21.5	.4
4111.9	6912.8	3283.1	5436.0	3039.4
				100.0

100.0

DIVERSITY INDEX CALCULATIONS

SHANGHAI INDEX	-	1.519
VAOJAPCE	-	.0003
MAXIMUM INDEX	-	3.091
EVANGELISM	-	.491
NO OF TAYL	-	22

STATION NUMBER - 2 MIDDLE STATION

NUMBERS OF REPLICATES - 3

SAMPLE DATE = 110461

TAXON	REP 1	REP 2	REP 3	MEAN	S.D.	RELATIVE ABUNDANCE	PERCENT
PHYLUM ANELIDA							
CLASS OLIGOCHAETA							
ORDER HAPLOTAXIDA							
FAMILY TUPIFICIDAE	10376.7	516.7	5382.1	5425.2	4930.2		67.0
FAMILY LUMARICULIDAE	129.2	.0	258.3	129.2	129.2		1.6
PHYLUM ACTINOPODA							
CLASS INSECTA							
ORDER EPHEMEROPTERA							
FAMILY EPHEMEROPTERIDAE							
ORDER PLECOPTERA							
FAMILY PLECOPTERIDAE	43.1	.0	.0	14.4	24.9		.2
ORDER DIPTERA							
FAMILY DIPTERIDAE	.0	43.1	.0	14.4	24.9		.2
FAMILY CECIDIIDAE							
FAMILY TROCHIDAE	172.2	.0	172.2	114.8	99.4		1.4
FAMILY HALIPTERIDAE	86.1	43.1	86.1	71.8	24.9		.9
ORDER TRICHOPTERA							
FAMILY HYDROPTILIDAE	.0	.0	10.8	3.6	4.2		.0
ORDER DIPTERA							
FAMILY CEPATROGONIDAE							
SUBFAMILY CERATOPSONINAE	.0	.0	43.1	14.4	24.9		.2
FAMILY CHIRONOMIDAE							
SUBFAMILY TETRACLADIINAE	693.9	712.0	2739.0	1219.9	382.6		15.1
TYPES TETRACLADIINI AND METEIOGNEINI							
SUBFAMILY CATERIDINAE							
TETRA CLERONININI	.0	.0	301.4	100.5	174.0		1.2
TETRA TANYTAXININI	.0	.0	43.1	14.4	24.9		.2
FAMILY MUSCIDAE	86.1	.0	43.1	43.1	43.1		.5
FAMILY TIPULIDAE							
CERAPATA	215.3	43.1	473.6	244.0	215.7		3.0
TIPULA	1593.1	43.1	172.2	602.8	960.1		7.4
PHYLUM MOLLUSCA							

CLASS GASTROPODA
ORDER BASIDIOMYXOPHORA
FAMILY PHYSIDAE
PHYSA

129.2 .0 129.2 86.1 74.6 1.1
13519.9 1420.9 9344.1 8098.3 6146.5 100.0

DIVERSITY INDEX CALCULATIONS

SHANNON INDEX - 1.203
VARIANCE - .0002
MAXIMUM INDEX - 2.704
EVENNESS - .443
NO OF TAXA - 15

STATION NUMBER - 3 HUNTER STATION
NUMBER OF REPLICATES - 3
SAMPLE DATE - 110481

TAXON	REP 1	DENSITY (#/M2) REP 2	RLP 3	MEAN	S.D.	PERCENT RELATIVE ABUNDANCE
-------	-------	-------------------------	-------	------	------	-------------------------------

PHYLUM ANNELIDA						
CLASS OLIGONEURATA						
ORDER MALLOPHAGA						
FAMILY TROICHTIDAE						
PHYLUM ARTHROPODA	1420.9	2583.4	1098.0	1700.8	781.3	82.6
CLASS INSECTA						
ORDER EPHEMEROPTERA						
FAMILY BAETIDAE						
BAETIS	.0	21.5	.0	7.2	12.4	.3
FAMILY TRICORYTHIDAE						
TRICORYTHIDAE	.0	21.5	21.5	14.4	12.4	.7
ORDER COLEOPTERA						
FAMILY MALLOPHAGA						
BEYCHUS	10.8	.0	.0	3.6	6.2	.2
ORDER TRICORYTHIDAE						
FAMILY HYDROPTILIDAE	10.8	10.8	21.5	14.4	6.2	.7
HYDROPTILIDAE						
ORDER DIPTERA						
FAMILY CHIRONOMIDAE						
SUBFAMILY TANYPIDINAE						
TRIBE TANYPIDINI	.0	.0	10.8	3.6	6.2	.2
SUBFAMILY TANYPIDINI						
TRIBE TANYPIDINI	.0	43.1	10.8	17.9	22.4	.9
SUBFAMILY TANYPIDINI						
TRIBE TANYPIDINI	75.3	473.6	64.6	204.5	233.1	9.9
SUBFAMILY TANYPIDINI						
TRIBE TANYPIDINI	10.8	43.1	43.1	32.3	18.6	1.6
TRIBE TANYPIDINI	10.8	75.3	.0	28.7	40.8	1.4
FAMILY SIMULIDAE						
SIMULIUM	.0	10.8	.0	3.6	6.2	.2
FAMILY TIPULIDAE						
HEMATOPHAGA	21.5	10.9	10.8	14.4	6.2	.7
TIPULA	10.8	21.5	10.8	14.4	6.2	.7

TOTAL 1571.6 3315.4 1291.7 2059.6 1096.5 100.0

DIVERSITY INDEX CALCULATIONS

SHANNON INDEX - .745
VARIANCE - .0036
MAXIMUM INDEX - 2.565
EVENNESS - .290
NO OF TAXA - 13

PERIPHYTON DATA

Table 2.5.2-4 Periphyton Species List	Page No. III-70
Table 2.5.2-5 Periphyton Bench Sheets	III-82
May, 1981	
Station 1	III-82
Station 2	III-84
Station 3	III-86
June, 1981	
Station 1	III-90
Station 2	III-92
Station 3	III-95
July, 1981	
Station 1	III-100
Station 2	III-101
Station 3	III-103
August, 1981	
Station 1	III-107
Station 2	III-110
Station 3	III-113
September, 1981	
Station 1	III-117
Station 2	III-119
Station 3	III-122
October, 1981	
Station 1	III-125
Station 2	III-128
Station 3	III-132
<u>Table 2.5.2-6 PERIPHYTON BIOMASS BENCH SHEETS</u>	III-136
May, 1981	III-136
June, 1981	III-137
July, 1981	III-138
August, 1981	III-139
September, 1981	III-140
October, 1981	III-141
<u>Table 2.5.2-7 PERIPHYTON BIOMASS ANALYSIS</u>	III-142
May, 1981	III-142
June, 1981	III-143
July, 1981	III-144
August, 1981	III-145
September, 1981	III-146
October, 1981	III-147

PERIPHYTON DATA

Table 2.5.2-8 PERIPHYTON DENSITY AND SPECIES DIVERSITY ESTIMATES

	III-148
May, 1981	
Station 1	III-148
Station 2	III-149
Station 3	III-150
June, 1981	
Station 1	III-152
Station 2	III-153
Station 3	III-155
July, 1981	
Station 1	III-157
Station 2	III-158
Station 3	III-160
August, 1981	
Station 1	III-162
Station 2	III-163
Station 3	III-165
September, 1981	
Station 1	III-168
Station 2	III-169
Station 3	III-170
October, 1981	
Station 1	III-173
Station 2	III-174
Station 3	III-176

Table 2.5.2-4

PERIPHYTON SPECIES LIST

CATHEDRAL BLUFFS SHALE OIL COMPANY
PICEANCE CREEK
1961

TAXON	STATION NUMBER		
	1	2	3
BACILLARIOPHYTA			
ACHNANTHES AFFINIS	X	X	X
ACHNANTHES EXICUA VAR. CONSTRICTA	X		
ACHNANTHES LANCEOLATA	X	X	X
ACHNANTHES LANCEOLATA VAR. DORIA	X	X	X
ACHNANTHES LINEARIS	X		
ACHNANTHES MICROCEPHALA	X	X	X
ACHNANTHES MINUTISSIMA	X	X	X
ACHNANTHES MINUTISSIMA	X	X	X
AMPHILEURA PELLUCIDA	X	X	X
AMPHORA CVALIS	X	X	X
AMPHORA PERUSILLA	X	X	X
AMPHORA VENETA	X	X	X
ASTERIONELLA FORMOSA	X		
CALONEIS APHISSAENA	X	X	X
CUCURONIS PEDICULUS	X	X	X
CUCURONIS PLACENTILA	X	X	X
CYCLOTELLA MENCHINIANA	X	X	X
CYCLOTELLA STELLICEPA	X	X	X
CYATOPLEURA ELLIPTICA	X	X	X
CYMBELLA AFFINIS	X		
CYMBELLA CISTULA	X		
CYMBELLA MICROCEPHALA	X		
CYMBELLA MINUA	X	X	X
CYMBELLA MINUA VAR. SILESIAEA	X	X	X
CYMBELLA SINUATA	X	X	X
CYMBELLA SP.	X		
CYMBELLA TIMIDA	X	X	X
DENTICULA FLECANIS	X		
DIATOMA TENUE VAR. ELONGATUM	X	X	X
DIATOMA VULGARE	X	X	X
ENTOMONIS PALUNDOSA	X	X	X
EPITHEMIA SCOPX	X	X	X
FRAGILARIA CAPRICINA	X	X	X
FRAGILARIA CONSTRUENS VAR. VENETA	X	X	X
FRAGILARIA CRYPTONENSIS	X	X	X
FRAGILARIA LEPTOSTAURON	X	X	X
FRAGILARIA PINNATA	X	X	X
FRAGILARIA VAUGHNIIAE	X	X	X
FRUSTULIA PHOMPOICES	X	X	X
GOMPHONEMA ACUMINATUM	X	X	X
GOMPHONEMA ANGUSTATUM	X	X	X
GOMPHONEMA INTRICATUM	X	X	X
GOMPHONEMA ELIVACEUM	X	X	X
GOMPHONEMA PARVULUM	X	X	X
GOMPHONEMA SIMUS	X	X	X
GOMPHONEMA SUBCLAVATUM	X	X	X
GOMPHONEMA SUBCLAVATUM VAR. UPSALIENSIS	X	X	X
GOMPHONEMA TETRACATUM	X	X	X
GYROSIGMA SPENCEPPI	X	X	X
HANNAEA ARCUS	X	X	X
MANTZSCHIA AMPHIOEYS	X	X	X

SURIELLA ANGUSTATA				X	X
SURIELLA LINPARIS	X			X	X
SURIELLA CIVILIS	X			X	X
SURIELLA OVATA	X			X	X
SYNDRA ACIS	X			X	X
SYNDRA FASCICULATA	X			X	X
SYNDRA MINISCUA	X			X	X
SYNDRA PARASITICA	X			X	X
SYNDRA PULCHELLA VAP. LANCEOLATA	X			X	X
SYNDRA ULPA	X			X	X
SYNDRA ULNA VAR. OXYRHYNCHUS	X			X	X
THALASSIOSIRA FLUVIATILIS	X			X	X

CHLOROPHYTA

CLADOPHORA GLOMERATA	X			X	X
CLADOPHORA SP.	X			X	X
CLUSTERIUM SP.				X	
DRAPARNALDIA SP.	X			X	X
UNIDENTIFIED GREEN COCCOID				X	
MICROSPERA SP.	X			X	X
GEORGONTUM SP.	X			X	X
PALMELLA STAGE OF CHAETOPHORACEAE	X			X	X
SCENESMUS QUADRICAUDA	X			X	X
SPIROGYRA SP.	X			X	X
STIGEOCLONIUM TENUE	X			X	X
TETRASPERA SP.	X			X	X
ULOTHRIX ZONATA	X				

CHRYSCOPHYTA

DINOTRYCEN SP.	X			X	X
HYDRURUS SP.				X	

CYANOPHYTA

ANABAENA CIRCINALIS	X			X	X
ANABAENA SP.	X			X	X
DACTYLOCCOCCOPSIS SP.				X	
NOSTOC SP.	X			X	X
OSCILLATORIA SP.	X			X	X
PHORMIDIUM SP.	X			X	X

EUGLENOPHYTA

EUGLENA ARCUS	X				
PHACUS SP.				X	

RHODOPHYTA

RHODOSPERMUM SP.	X				
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X = ORGANISM IDENTIFIED TO THIS TAXONOMIC LEVEL OBSERVED AT SAMPLING STATION

CATHEDRAL BLUFFS SHALE OIL COMPANY
PICEANCE CREEK

1961
SPECIES OCCURRENCE BY SAMPLING DATE AT STATION 1

[illegible]

PERIPLHYTON SPECIES LIST

CATHEDRAL BLUFFS SHALE OIL COMPANY
PICRANCE CREEK

SPECIES OCCURRENCE BY SAMPLING DATE AT STATION 2
1981

TAXON	SAMPLING DATE				
	MAY	JUNE	JULY	AUG	SEPT
OCT					
BACILLARIOPHYTA					
ACHNANTHES AFFINIS		X			X
ACHNANTHES LANCEOLATA		X			
ACHNANTHES LANCEOLATA VAR. DUBIA	X	X	X	X	X
ACHNANTHES MICROCEPHALA					X
ACHNANTHES MINUTISSIMA	X	X	X	X	X
AMPHIPLEURA PELUCIDIA					X
AMPHORA OVALIS		X	X	X	X
AMPHORA PERUSILLA	X	X	X	X	X
AMPHORA VENETA		X			
CALONEIS AMPHISBAENA	X				X
COCCONEIS PEDICULUS	X	X	X	X	X
COCCONEIS PLACENTULA	X	X	X	X	X
CYCLOTELLA MENEGHINIANA	X	X	X	X	X
CYMATOPLEURA ELLIPTICA				X	X
CYTBELLA AFFINIS				X	
CYTBELLA MINUTA	X			X	X
CYTBELLA MINUTA VAR. SILESIACA	X	X	X	X	X
CYTBELLA SINUATA	X		X	X	X
CYTBELLA TUMIDA				X	X
DIATOMA TENUE VAR. ELONGATUM		X	X	X	X
DIATOMA VULGARE		X	X	X	X
ENTOMONEIS PALUDOSA					X
EPITHEMIA SOREX			X		
FRAGILARIA CAPUCINA			X	X	X
FRAGILARIA CONSTANS VAR. VENETA			X	X	X
FRAGILARIA CROTONENSIS			X	X	X
FRAGILARIA LEPTOSTAURON	X				X
FRAGILARIA VAUCHERIAE	X	X	X	X	X
GOMPHONEMA ACUMINATUM			X	X	X
GOMPHONEMA ANGUSTATUM			X	X	X
GOMPHONEMA INTRICATUM			X	X	X
GOMPHONEMA OLIVACEUM		X	X	X	X
GOMPHONEMA SIMUS			X	X	X
GOMPHONEMA SUBCLAVATUM			X	X	X
GOMPHONEMA SUBCLAVATUM VAR. UPSALIENSIS	X			X	X
GOMPHONEMA TRUNCATUM			X	X	X
CRUSIGMA SPENCEII					X
HANTZSCHIA AMPHIOXYS		X		X	X
MELOSIRA VARIANS		X		X	X
NAVICULA ARVENSIS	X				
NAVICULA CAPITATA		X			
NAVICULA CINCTA					X
NAVICULA CRYPTOCEPHALA		X	X	X	X
NAVICULA CRYPTOCEPHALA VAR. VENETA	X	X	X	X	X
NAVICULA ELGENENSIS					X
NAVICULA EXIGUA					X
NAVICULA GUTTLANDICA					X
NAVICULA HALOPHILA		X			X

CHRYSOPHYTA

DINOBRYON SP. X
HYDRODUS SP. X

CYANOPHYTA

ANABENA CIRCINALIS X
ANABENA SP. X
OSCILLATORIA SP. X
PHORMIDIUM SP. X

EUGLENOPHYTA

PHACUS SP. X

RHODOPHYTA

X = ORGANISM IDENTIFIED TO THIS TAXONOMIC LEVEL OBSERVED AT SAMPLING STATION

PERIPHYTE SPECIES LIST

CATHEDRAL BLUFFS SHALE OIL COMPANY
PICEANCE CREEK

SPECIES OCCURRENCE BY SAMPLING DATE AT STATION 3
1981

TAXON	MAY	JUNE	JULY	AUG	SEPT	OCT
BACILLARIOPHYTA						
ACHNANTHES AFFINIS					X	X
ACHNANTHES LANCEOLATA					X	X
ACHNANTHES LANCEOLATA VAR. DUBIA	X	X	X	X	X	X
ACHNANTHES MICROCEPHALA					X	X
ACHNANTHES MINUTISSIMA	X	X	X	X	X	X
AMPHORA OVALIS	X	X	X	X	X	X
AMPHORA PERPUSILLA	X	X	X	X	X	X
AMPHORA VENETA						
CALLONEIS APHISRAENA	X	X	X	X	X	X
COCCONEIS PEDICULUS	X	X	X	X	X	X
COCCONEIS PLACENTULA	X	X	X	X	X	X
CYCLOTELLA YFNEGINIANA	X	X	X	X	X	X
CYMBELLA MINUTA VAR. SILESIACA	X	X	X	X	X	X
CYMBELLA SINUATA	X	X	X	X	X	X
CYMBELLA SP.						
DIATOMA TENUE VAR. ELONGATUM						
DIATOMA VULGARE	X	X	X	X	X	X
ENTOMONEIS PALUDOSA	X	X	X	X	X	X
FRAGILARIA CROTONEINENSIS						
FRAGILARIA LPTOSTAURON						
FRAGILARIA PINNATA	X	X	X	X	X	X
FRAGILARIA VAUCHERIAE						
GOMPHONEMA ANGIUSTATUM	X	X	X	X	X	X
GOMPHONEMA INTRICATUM						
GOMPHONEMA OLIVACEUM	X	X	X	X	X	X
GOMPHONEMA SUBCLAVATUM	X	X	X	X	X	X
GOMPHONEMA SUBCLAVATUM VAR. UPSALIENSIS	X	X	X	X	X	X
GYFOSICHA SPENCERII	X	X	X	X	X	X
HANTZSCHIA AMPHIOXYIS						
MELOSIRA VARIANS						
NAVICULA ARVENSIS						
NAVICULA CAPITATA						
NAVICULA CINCTA						
NAVICULA CRYPTOCERPHALA	X	X	X	X	X	X
NAVICULA CRYPTOCERPHALA VAR. VENETA	X	X	X	X	X	X
NAVICULA CUSPIDATA						
NAVICULA ELGINENSIS						
NAVICULA HEUFLEI	X	X	X	X	X	X
NAVICULA LANCEOLATA	X	X	X	X	X	X
NAVICULA MINUTICULUS VAR. UPSALIENSIS	X	X	X	X	X	X
NAVICULA MINUTA						
NAVICULA MINUSCULA						
NAVICULA NOTHA						
NAVICULA PELLICULOSA						
NAVICULA PROTACTA						
NAVICULA PYGMATA						
NAVICULA PYGMEOCERPHALA						
NAVICULA SECURIA VAR. APICULATA	X	X	X	X	X	X

NAVICULA TRIPUNCTATA VAR. SCHIZONEMOIDES

NAVICULA VIRIDULA X X X X X

NAVICULA VIRIDULA VAR. AVENACEA

NAVICULA SP. X X X X X

NAVICULA ACICULARIS

NAVICULA ACICULARIS X X X X X

NAVICULA COMMUNIS

NAVICULA COMMUNIS X X X X X

NAVICULA DENTICULA

NAVICULA DENTICULA X X X X X

NAVICULA DISSIPATA

NAVICULA DISSIPATA X X X X X

NAVICULA FRUSTULUM

NAVICULA FRUSTULUM X X X X X

NAVICULA MOLSATICA

NAVICULA MOLSATICA X X X X X

NAVICULA HUNGARICA

NAVICULA HUNGARICA X X X X X

NAVICULA IGNORATA

NAVICULA IGNORATA X X X X X

NAVICULA LATENS

NAVICULA LATENS X X X X X

NAVICULA LINEARIS

NAVICULA LINEARIS X X X X X

NAVICULA OSTUSA

NAVICULA OSTUSA X X X X X

NAVICULA PALCA

NAVICULA PALCA X X X X X

NAVICULA ROMANA

NAVICULA ROMANA X X X X X

NAVICULA SIGMOIDEA

NAVICULA SIGMOIDEA X X X X X

NAVICULA TRYBLIONELLA

NAVICULA TRYBLIONELLA X X X X X

NAVICULA TRYBLIONELLA VAR. LEVIDENSIS

NAVICULA TRYBLIONELLA VAR. LEVIDENSIS X X X X X

NAVICULA SP.

NAVICULA SP. X X X X X

PINULARIA SP.

PINULARIA SP. X X X X X

PLEUROSICHA DELICATISSIMA

PLEUROSICHA DELICATISSIMA X X X X X

RHOICOSPHEMIA CURVATA

RHOICOSPHEMIA CURVATA X X X X X

RHOICOSPHEMIA GIBBERULA

RHOICOSPHEMIA GIBBERULA X X X X X

RHOICOSPHEMIA MUSCULUS

RHOICOSPHEMIA MUSCULUS X X X X X

SURIRELLA ANGUSTATA

SURIRELLA ANGUSTATA X X X X X

SURIRELLA LINEARIS

SURIRELLA LINEARIS X X X X X

SURIRELLA UVALIS

SURIRELLA UVALIS X X X X X

SURIRELLA OVATA

SURIRELLA OVATA X X X X X

SYNEDRA ACIS

SYNEDRA ACIS X X X X X

SYNEDRA FASCICULATA

SYNEDRA FASCICULATA X X X X X

SYNEDRA PARASITICA

SYNEDRA PARASITICA X X X X X

SYNEDRA PULCHRELLA VAR. LANCEOLATA

SYNEDRA PULCHRELLA VAR. LANCEOLATA X X X X X

SYNEDRA ULNA

SYNEDRA ULNA X X X X X

SYNEDRA ULNA VAR. OXYRHYNCHUS

SYNEDRA ULNA VAR. OXYRHYNCHUS X X X X X

THALASSIOSIRA FLUVIATILIS

THALASSIOSIRA FLUVIATILIS X X X X X

CHLOROPHYTA

CHLOROPHYTA X X X X X

CLADOPHORA GLOMERATA

CLADOPHORA GLOMERATA X X X X X

CLADOPHORA SP.

CLADOPHORA SP. X X X X X

DRAPARNALOIDIA SP.

DRAPARNALOIDIA SP. X X X X X

MICROSPORA SP.

MICROSPORA SP. X X X X X

PALMELLA STAGE OF CHAETOPHORACEAE

PALMELLA STAGE OF CHAETOPHORACEAE X X X X X

SCENEDESMUS QUADRICAUDA

SCENEDESMUS QUADRICAUDA X X X X X

SPIROGYRA SP.

SPIROGYRA SP. X X X X X

STIGMOCOLONIUM TENUE

STIGMOCOLONIUM TENUE X X X X X

TETRASTROPHIA SP.

TETRASTROPHIA SP. X X X X X

CHRYSOPHYTA

CHRYSOPHYTA X X X X X

DINOBRYON SP.

DINOBRYON SP. X X X X X

CYANOPHYTA

CYANOPHYTA X X X X X

ANABAENA CIRCINALIS

ANABAENA CIRCINALIS X X X X X

ANABAENA SP.

ANABAENA SP. X X X X X

DACTYLOCOCCOPSIS SP.

DACTYLOCOCCOPSIS SP. X X X X X

OSCILLATORIA SP.

OSCILLATORIA SP. X X X X X

PHORMIDIUM SP.

PHORMIDIUM SP. X X X X X

FUGLENOPHYTA

FUGLENOPHYTA X X X X X

RHODOPHYTA

X = ORGANISM IDENTIFIED TO THIS TAXONOMIC LEVEL OBSERVED AT SAMPLING STATION

Table 2.5.2-5

PERI-PHYTON RESEARCH SHEET

CATHEDRAL ALUFFS SHALE OIL COMPANY
PICEANCE CREEKSTATION 1 - STEWART STATION
NUMBER OF REPLICATES - 3REPLICATE - A
SAMPLE DATE - 052881

C - 430 V - 124 ML OF - 1199 L - 50 MM W - 1 MM 0 - 1 MM S - 2 A - 3750 MM2

SUBSTRATE - GLASS SLIDE

LOG NUMBER - J44-101 ANALYST - RC

NUMBER COUNTED

TAXON CODE TAXON DIATOMS PROPORTIONAL COUNT SEOLWICK-WAFTER COUNT

INAVIA	NAVICULA VIRIDULA VAR. AVENACEA	104	
INISIE	NITZSCHIA SIGMOIDEA	P	
IGSYPE	CYRTOGMA SPENCERII	P	
SEUARC	ELCLENA ARCUS		P
ISUOVL	SUPRILLA OVALIS	P	
NEIOILM SP.		P	
ISUOVL	SUPRILLA OVATA	12	
IPHOUE	PHICOSPENIA CURVATA	2	
ICOCPL	COCCONEIS PLACENTULA	P	
INILIN	NITZSCHIA LINEARIS	6	
2SCGOU	SCENEDESMUS QUADRICAUDA		P
INIMIN	NITZSCHIA HUNGARICA	2	
INASEA	NAVICULA SECURETA VAR. APICULATA	7	
IAHVEN	AMPHOCIA VENETA	2	
INIOIS	NITZSCHIA DISSIPATA	9	
ININOL	NITZSCHIA HOLSATICA	3	
ICYMMS	CYRPELLA MINUTA VAR. SILESIACA	1	
INIERU	NITZSCHIA FRUSTULUM	1	
IFRAVA	FRAGILARIA VAUCHERIAE	1	
IDIVUL	DIATOMA VULGARE	1	
ICYMHI	CYRPELLA MINUTA	2	
INACRW	NAVICULA CRYPTOCEPHALA VAR. VENETA	10	
ISYULN	SYNEDRA LUNA	2	
ICOCPE	COCCONEIS PERICULUS	1	
IPHUS	PHOPALODIA MUSCULUS	1	
INANT	NAVICULA NOTHA	1	
IGOANG	GOMPHONEMA ANGHUSTATUM	P	
INIAPI	NITZSCHIA APICULATA	P	
IGUOLI	GOMPHONEMA OLIVACEUM	P	
ICYCH	CYCLotella MEGACHITIANA	P	
LIPIRE	PINNULARIA PREBISSENI	P	

STATION 1 - STEWART STATION

NUMBER OF REPLICATES - 3

REPLICATE - R
SAMPLE DATE - 052801

C - 380 V - 124 ML OF - 1199 L - 50 MM W - 1 MM D - 1 MM S - 2 A - 3750 MM2
SUBSTRATE - GLASS SLIDE

LOG NUMBER - 144-102 ANALYST - RD

TAXON CODE	TAXON	NUMBER COUNTED	
		DIATOMS	NON-DIATOMS
		PROPORTIONAL COUNT	SEDG-ICK-RAFTER COUNT
1NAVIA	NAVICULA VIRIDULA VAR. AVENACEA	100	
1SUOVA	SUTIRELLA OVATA	4	
1SUOVL	SUTIRELLA OVALIS	2	
1NILIN	NITZSCHIA LINEARIS	2	
1CAAMP	CALONEIS AMPHISRAENA	1	
1CUCPE	COCconeis PEDICULUS	1	
1NASEA	NAVICULA SECURATA VAR. APICULATA	29	
1NIDIS	NITZSCHIA DISSIPATA	16	
1NEPAL	NITZSCHIA PALFA	11	
1PRAVA	FRAGILARIA VAUCHERIAE	2	
1NAHEU	NAVICULA HEULELEPI	3	
1NANOT	NAVICULA NOTHA	8	
1CYCME	CYCLITELLA MENEGHINIANA	1	
1ACMIN	ACMANTHUS INDISSIPATA	8	
1GOLINT	GOMPHONEPA INTRICATUM	1	
1NIFRL	NITZSCHIA FRUSTULUM	5	
1GJOLI	GOMPHONEPA OLIVACEUM	1	
1NACRY	NAVICULA CRYPTOCEPHALA VAR. VENETA	1	
1NIGEN	NITZSCHIA DENTICULA	1	
1GOLPAR	GOMPHONEPA PAPILLUM	1	
1NIM3L	NITZSCHIA HOLSATICA	3	
1GJANG	GOMPHONEPA ANGUSTATUM	1	
1NALAN	NAVICULA LANCEOLATA	1	
1CYMIL	CYRELLA TUMIDA	1	
1NIMUN	NITZSCHIA MURCAPICA	P	
1CYMCI	CYRELLA CISTULA	P	
1NAPRO	NAVICULA PROTTRACTA	P	
1AMLVF	APPALPA CVALIS	P	
1NAARY	NAVICULA ARVENSTIS	P	
1AMPEO	APPALPA PERPUSILLA	P	
1MHOU	MACROGOMPHONEPA CURVATA	P	

STATION 1 - STEWART STATION
NUMBER OF REPLICATES - 3

REPLICATE - C
SAMPLE DATE - 052801

C - 493 V - 124 ML OF - 1199 L - 50 MM W - 1 MM D - 1 MM S - 2 A - 3750 MM2
SUBSTRATE - GLASS SLIDE

LOG NUMBER - 144-103 ANALYST - PD

NUMBER COUNTED

TAXON CODE	TAXON	DIATOMS		NON-DIATOMS	
		PROPORTIONAL COUNT	SEDGWICK-Rafter COUNT	PROPORTIONAL COUNT	SEDGWICK-Rafter COUNT
INAVIA	NAVICULA VIRIDULA VAR. AVENACEA			100	
ISUGVA	SUTRELLA OVATA			1	
IPHCUR	RHOIDSOPHENTIA CURVATA			1	
INILIN	NIITZSCHIA LINEARIS			P	
ICCCPE	COCconeis PEDICULUS			P	
INIPAL	NIITZSCHIA PALFA			7	
INASEA	NAVICULA SEGRETA VAR. APICULATA			6	
INIHUN	NIITZSCHIA HUNGARICA			2	
ICYCME	CYCLOTELLA YENECHEMINIANA			2	
INANAM	HANTZSCHIA AMPHIOXYS			1	
INIDIS	NIITZSCHIA DISSIPATA			7	
INACRV	NAVICULA CRYPTOCEPHALA VAR. VENETA			4	
IACHIN	ACHNANTHES MINUTISSIMA			2	
IGOINT	GOMPHONEMA INTRICATUM			2	
IFPAVA	FRAGILARIA VAUCHERIAE			3	
INIHOL	NIITZSCHIA HOLSATICA			1	
INANDI	NAVICULA NOTHA			1	
IACLAN	ACHNANTHES LANCEOLATA			1	
INIFRU	NIITZSCHIA FRUSTILLUM			4	
IOIVUL	DIATOMA VULGARE			2	
IACMIC	ACHNANTHES MICROCEPHALA			1	
INAMUT	NAVICULA MUTICA			1	
ICYMS	CYPRILLA MINUTA VAR. SILESTIACA			P	

STATION 2 - MIDDLE STATION
NUMBER OF REPLICATES - 3REPLICATE - A
SAMPLE DATE - 052881C - 295 V - 125 ML DF - 3100 L - 50 MM W - 1 MM O - 1 MM S - 2 A - 3750 MM2
SUBSTRATE - GLASS SLIDE

LOG NUMBER - 144-104 ANALYST - RD

NUMBER COUNTED

TAXON CODE	TAXON	DIATOMS		NON-DIATOMS	
		PROPORTIONAL COUNT	SEDGWICK-Rafter COUNT	PROPORTIONAL COUNT	SEDGWICK-Rafter COUNT
2PALCH	PALMELLA STAGE OF CHARTOPHORACEAE				74
INAVIA	NAVICULA VIRIDULA VAR. AVENACEA			5	
ICCCPE	COCconeis PEDICULUS			13	

ICAMP	CALONEIS AMPHISRAENA	P
IRHUR	RHICOSPHEMIA CURVATA	P
ICYMS	CYMBELLA MINUTA VAR. SILESIA	P
SPHSE	PHAEUS SP.	P
INAMUT	NAVICULA MUTICA	6
IACIN	ACHNANTHES MINUTISSIMA	56
IACLAN	ACHNANTHES LANCEOLATA	102
ICUCPL	COCconeis PLACENTULA	7
IGDSUR	GOPHONEMA SUBCLAVATUM	2
IACLAU	ACHNANTHES LANCEOLATA VAR. DORIA	2
INASEA	NAVICULA SECURETA VAR. APICULATA	1
INIDIS	NITZSCHIA DISSIPATA	1
INALAN	NAVICULA LANCEOLATA	1
ICYCME	CYCLotella MENEGHINIANA	1
INIPRU	NITZSCHIA FRUSTULUM	3
IAMPRE	AMPHITHA PERPUSILLA	1
ISUOVA	STRIOVILLA OVATA	3
ICYPSI	CYMBELLA SINUATA	1
INAMUT	NAVICULA NOTHA	P
IPRALE	FRAGILARIA LEPTOSTAURON	P
INAPRO	NAVICULA PROTRACTA	P
IRHNS	RHOPALODIA MUSCULUS	P

STATION 2 - MIDDLE STATION
NUMBER OF REPLICATES - 3

REPLICATE - P

SAMPLE DATE - 052081

C - 222 V - 125 ML DF - 1140 L - 50 MM W - 1 MM D - 1 MM S - 2 A - 3750 MM2

SUBSTRATE - GLASS SLIDE

LOC NUMBER - 146-105 ANALYST - RD

NUMBER COUNTED

TAXON CODE	TAXON	DIATOMS	NON-DIATOMS
		PROPORTIONAL COUNT	SEDGWICK-WATKIN COUNT

2GRCCO	UNIDENTIFIED GREEN COCCOID		P
2PALCH	PALELLA STAGE OF CHARTOPHOPACEAE		64
INAVIA	NAVICULA VIRIDULA VAR. AVERNACIA	4	
ICOCPE	COCconeis PEDICELLUS	5	
INAEV	NAVICULA AVERNENSIS	1	
ICUCPL	COCconeis PLACENTULA	27	
IACLAN	ACHNANTHES LANCEOLATA	116	
IACIN	ACHNANTHES MINUTISSIMA	30	
INASEA	NAVICULA SECURETA VAR. APICULATA	1	
INIPAL	NITZSCHIA PALEA	1	
INILIN	NITZSCHIA LINEARIS	1	
ICYMS	CYMBELLA MINUTA VAR. SILESIA	P	
IPRALE	FRAGILARIA LEPTOSTAURON	P	
ISUOVL	STRIOVILLA OVATA	P	
ISUOVA	SUSPENSULA OVATA	P	

STATION 2 - MIDDLE STATION
NUMBER OF REPLICATES - 3

REPLICATE - C
SAMPLE DATE - 052881

C - 207 V - 124 ML DF - 1:149 L - 50 MM W - 1 MM D - 1 MM S - 2 A - 3750 MM2
SUBSTRATE - GLASS SLIDE

LOG NUMBER - 144-106 ANALYST - RD

NUMBER COUNTED

TAXON CODE TAXON DIATOMS NON-DIATOMS
PROPORTIONAL COUNT SEDGWICK-RAFTER COUNT

2PALCH	PALMELLA STAGE OF CHAETOPHORACEAE		22
1COCPE	COCconeis PEDICULUS	9	
1ACLAN	ACHNANTHES LANCEOLATA	102	
1ACPIN	ACHNANTHES MINUTISSIMA	45	
1NIFRU	NITZSCHIA FRUSTULUM	3	
1COCPL	COCconeis PLACENTULA	15	
1NASEA	NAVICULA SECURITA VAR. APICULATA	3	
1NAVIA	NAVICULA VIOLULA VAR. AVENACEA	11	
1SUOVA	STRIPPELLA OVATA	5	
1NIGIS	NITZSCHIA DISSIPATA	4	
1NIPAL	NITZSCHIA PALEA	2	
1NIAPI	NITZSCHIA APICULATA	1	
1ACLAN	ACHNANTHES LANCEOLATA VAR. DURIA	2	
1CYMNI	CYMBELLA MINUTA	1	
1NILI	NITZSCHIA LINEARIS	2	
1NANOT	NAVICULA NOTHA	2	
1FRAVA	FRAGILARIA VAUCHERETIAE	1	
1NACAV	NAVICULA CRYPTOCEPHALA VAR. VENETA	1	
1SUOVL	STRIPPELLA OVALIS	P	

STATION 3 - HUNTER STATION
NUMBER OF REPLICATES - 3

REPLICATE - A
SAMPLE DATE - 052881

C - 385 V - 124 ML DF - 1:199 L - 50 MM W - 1 MM D - 1 MM S - 2 A - 3750 MM2
SUBSTRATE - GLASS SLIDE

LOG NUMBER - 144-107 ANALYST - RD

NUMBER COUNTED

TAXON CODE TAXON TAXON CODE TAXON TAXON CODE TAXON TAXON CODE TAXON

21

2STITE STIGFOCLONIUM TENUE 16
 1NAVIA NAVICULA VIRIDULA VAR. AVENACEA 107
 1ACHIN ANTHES MINUTISSIMA 27
 1ACLAO ANTHES LANCEOLATA VAR. DORIA 11
 1NIPAL NITZSCHIA PALEA 1
 1NIIGH NITZSCHIA IGNERATA 3
 1NASEA NAVICULA SECRETA VAR. APICULATA 4
 1SUOVA SIRIRELLA OVATA 3
 1NIDIS NITZSCHIA DISSIPATA 3
 1NACRY NAVICULA CRYPTOCEPHALA VAR. VENETA 4
 1NIFRU NITZSCHIA FRUSTILLUM 3
 1COOLI GOMPHONEMA OLIVACEUM 5
 1NIDIL NITZSCHIA HOLSATICA 1
 1NAMEU NAVICULA MENISCULUS VAR. UPSALIENSIS 1
 1AMPER APPACRA PEPUSILLA 1
 1GYSTE GYKOSIGMA SPENCERII 1
 1GOSUR GOMPHONEMA SUBCLAVATUM P
 1NIHUN NITZSCHIA HUNGARICA P
 1NILIN NITZSCHIA LINEARIS P
 1COCPL COCCONEIS PLACENTULA P
 1CUCPE COCCONEIS PEDICULUS P
 1RHOUR RHICOSPHEMIA CLAVATA P
 1ACLAN ANTHES LANCEOLATA P
 1AMQVP AMPHORA OVALIS P
 1CAAMP CALONEIS AMPHISRAENA P
 1SUOVL SIRIRELLA OVALIS P
 1CYHMS CYMBELLA MINUTA VAR. SILFISIACA P
 1CYFSI CYMBELLA SINUATA P
 1SYFAS SYNERGIA FASCICULATA P
 1SYULN SYNERGIA ULNA P

STATION 3 - HUNTER STATION
 NUMBER OF REPLICATES - 3

REPLICATE - P
 SAMPLE DATE - 0528P1

C - 340 V - 124 ML DF - 1199 L - 50 MM W - 1 MM D - 1 MM S - 2 A - 3750 MMZ

SUBSTRATE - GLASS SLIDE

LOG NUMBER - 144-104 ANALYST - RD

NUMBER COUNTED

TAXON CODE TAXON TAXON CODE TAXON TAXON CODE TAXON TAXON CODE TAXON

1NAVIA NAVICULA VIRIDULA VAR. AVENACEA 40
 1RHOUR RHICOSPHEMIA CLAVATA 2

1500VL	SUPIRELLA OVALIS	1	27
25TIE	STIGEOCLONIUM TENUE		
1500VA	SUTPELLA OVATA	3	
1500VE	GYROSIGMA SPENCERII	P	
1500VF	COCCONEIS PEDICULUS	P	
1500VG	NAVICULA PALEA	13	
1500VH	SUTIRELLA LINEARIS	P	
1500VI	ACHPANTHES MINUTISSIMA	100	
1500VJ	ACHPANTHES LANCEOLATA VAR. DUBIA	19	
1500VK	NAVICULA FRUSTULUM	6	
1500VL	NAVICULA SECRETA VAR. APICULATA	3	
1500VM	AMPHODIA FERPUSILLA	2	
1500VN	AMPHODIA CVALIS	1	
1500VO	NAVICULA GENTICULA	1	
1500VP	NAVICULA LINEARIS	2	
1500VQ	GOMPHONEMA ANGUSTATUM	5	
1500VR	NAVICULA HEUFLEI	2	
1500VS	NAVICULA FRUSTULUM	1	
1500VT	NAVICULA CRYPTOCEPHALA VAR. VENETA	1	
1500VU	COCCONEIS PLACENTULA	P	
1500VV	CYCLOTHELLA MENECHINIANA	P	
1500VW	NAVICULA HUNGARICA	P	
1500VX	FRAGILARIA PINNATA	P	
1500VY	CYMBELLA SINUATA	P	
1500VZ	NAVICULA HOLSATICA	P	
1500VA	GOMPHONEMA OLIVACEUM	P	

STATION 3 - HUNTER STATION
NUMBER OF REPLICATES - 3

REPLICATE - C
SAMPLE DATE - 052RR1

C - 350 V - 124 ML DF - 11100 L - 50 MM W - 1 MM D - 1 MM S - 2 A - 3750 MH2
SUBSTRATE - GLASS SLIDE

LOG NUMBER - 144-106 ANALYST - RD

NUMBER COUNTED

TAXON CODE TAXON DIATOMS NON-DIATOMS
PROPORTIONAL COUNT SEDGWICK-RAFTER COUNT

25TIE	STIGEOCLONIUM TENUE		20
1500VA	NAVICULA MINUSCULUS VAR. UPSALIENSIS	1	
1500VB	ACHPANTHES FINGITISSIMA	100	
1500VC	NAVICULA VIBIDULA VAR. AVENACEA	25	
1500VD	NAVICULA PALEA	13	
1500VE	NAVICULA SECRETA VAR. APICULATA	6	
1500VF	NAVICULA COMMUNIS	1	
1500VG	NAVICULA DISSEPTATA	3	
1500VH	NAVICULA HEUFLEI	7	
1500VI	NAVICULA LANCEOLATA	1	
1500VJ	SUTIRELLA OVALIS	1	
1500VK	SYNEDRA ULNA	1	

ISUOVA	SURIRELLA OVATA	2
ISCLAD	ACHNANTHES LANCEOLATA VAR. DURIA	13
IGGLJ	GEOPHONEMA OLIVACEUM	1
INACRV	NAVICULA CRYPTOCEPHALA VAR. VENETA	1
INILIN	NITZSCHIA LINEARIS	1
INIFRU	NITZSCHIA FRUSTULUM	3
INIHUN	NITZSCHIA HUNGARICA	P
IGJANG	GEOPHONEMA ANGUSTATUM	P

PERLPHYTON RENCH SHEET

CATHEDRAL BLUFFS SHALE OIL COMPANY
PICEANCE CREEK

STATION 1 - STEWART STATION
NUMBER OF REPLICATES - 3

REPLICATE - A
SAMPLE DATE - 063061

C - 112 V - 125 ML OF - 199 L - 50 MM W - 1 MM D - 1 MM S - 2 A - 3750 MM2
SUBSTRATE - GLASS SLIDE

LOG NUMBER - 144-119 ANALYST - PD

NUMBER COUNTED

TAXON CODE TAXON DIATOMS PROPORTIONAL COUNT SEDGWICK-RAPTER COUNT NON-DIATOMS

1CUCPL	COCONEIS PLACENTULA	7			
2CLASP	CLAOPHORA SP.				P
2STIE	STIGEOCLONIUM TENUE				P
2PALCH	PALMELLA STAGE OF CHAETOPHORACEAE				
1NAVIR	NAVICULA VIRIDULA	100			
1SYFAS	SYMPHRA FASCICULATA	2			
1SYULN	SYNEURA ULNA	11			
1SUOVA	SUPELLE OVATA	11			
1NAHEU	NAVICULA HEUFLERI	1			
1PHCUR	PHOCOSPHEA CURVATA	2			
1PIINT	PINULARIA INTERMEDIA	1			
1SYULU	SYNEURA ULNA VAR. OXYRHYNCHUS	24			
1DIIVUL	DIATOMA VULGARE	1			
1SYACU	SYNEURA ACUS	6			
1GCOLI	GOMPHONEURA OLIVACEUM	1			
1NIPAL	NITZSCHIA PALFA	3			
1CAAMP	CALTHEIS AMPHISPAENA	1			
1NIMUN	NITZSCHIA HUNGARICA	1			
1NILIN	NITZSCHIA LINEARIS	2			
1NAHAL	NAVICULA HALOPHILA	1			
1ACPIN	ACHNANTHES MINUTISSIMA	8			
1NACRV	NAVICULA CRYPTOCERPHALA VAR. VENETA	7			
1NIFPU	NITZSCHIA FRUSTULUM	7			
1NIDIS	NITZSCHIA DISSIPATA	2			
1ACLAN	ACHNANTHES LANCEOLATA	1			
1NILAT	NITZSCHIA LATENS	1			
4OSPP	OSCILLATORIA SP.				2
4ANASP	ANABAEANA SP.				8

STATION 1 - STEWART STATION
NUMBER OF REPLICATES - 3

REPLICATE - P

SAMPLE DATE - 0630A1

C - 271 V - 125 ML OF - 1149 L - 50 MM W - 1 MM D - 1 MM S - 2 A - 3750 MM2
SUBSTRATE - GLASS SLIDE

LOG NUMBER - 144-12C ANALYST - PD

NUMBER COUNTED

TAXON CODE	TAXON	DIATOMS PROPORTIONAL COUNT	NON-DIATOMS SEDG-ICK-AFTER COUNT
100CE	COCCHIEIS PEDICULUS	1	
25TTE	STIGEOCLENIUM TENUE		3
1NAVIR	NAVICULA VIRIDULA	100	
1NIPAL	NAVICULA PALFA	12	
1NITIS	NITZSCHIA DISSIPATA	24	
1FRAVA	FRAGILARIA VAUCHERIAE	8	
1CYMMS	CYPRIDELLA MINUTA VAR. STLESIACA	9	
1ACMINT	ACMANTHES MINUTISSIMA	51	
1NAPEL	NAVICULA PELLICULOSA	1	
1CYCTE	CYCLITELLA STELLIGERA	1	
1NACRY	NAVICULA CRYPTOCEPHALA VAR. VENETA	23	
1NILLM	NITZSCHIA LINEARIS	10	
1HAAPO	HANNULA ARCUS	2	
1SYACU	SYNECHA ACUS	3	
1SYOLD	SYNECHA ULMA VAR. OXYRHYNCHUS	16	
1NIMON	NITZSCHIA HUNGARICA	1	
4ANASP	ANASTASIA SP.		1
25CEQU	SCENESMUS QUADRICAUDA		3
1NIFRU	NITZSCHIA FRUSTULUM	67	
1SULVA	SULPHELLA OVATA	8	
1ACLAN	ACMANTHES LANCEOLATA	8	
1GOLLI	GOPHONEMA OLIVACEUM	2	
1CYCKE	CYCLITELLA MENEGHINIANA	13	
1NIMCL	NITZSCHIA MOLSAITICA	11	
1SYULN	SYNECHA LUNA	7	
100CPL	COCCHIEIS PLACENTULA	11	
1HEPCI	HEPLION CIRCULARE	3	
1RMUS	RHOPALODIA MUSCULUS	1	
1DIULV	DIATOMA VULGARE	2	
1RHCUA	RHODOSPHERIA CURVATA	2	
1NITAT	NITZSCHIA LATENS	2	
1GYSPI	GYROSIGMA SPENCERII	1	
1CYPMI	CYPRIDELLA MINUTA	1	
1GJINT	GOPHONEMA INTRICATUM	1	
1SUJVL	SULPHELLA OVALIS	1	
1ACEXC	ACMANTHES EXIGUA VAR. CONSTRICTA	1	

STATION 1 - STEWART STATION
NUMBER OF REPLICATES - 2

REPLICATE - C
SAMPLE DATE - 0630A1

C - 188 V - 125 ML OF - 1480 L - 50 MM W - 1 MM D - 1 MM S - 2 A - 3750 MM2
SUBSTRATE - GLASS SLIDE

LOG NUMBER - 144-121 ANALYST - RD

NUMBER COUNTED

TAXON CODE	TAXON	DIATOMS	PROPORTIONAL COUNT	SEDGWICK-RAFTER COUNT	NON-DIATOMS
25ITE	STIGODONTELLUM TENUE				P
1CYME	CYCLOTELLA MENEGHINIANA	2			
1COCE	COCONEIS PEDICULUS	3			
1SYACU	SYNEDRA ACUS	5			
1INHU	INITZSCHIA HUNGARICA	3			
1ACPIN	ACHNANTHES MINUTISSIMA	53			
1ACHUR	ACHNANTHES MINUTISSIMA	10			
1INFRU	INITZSCHIA FRUSTULUM	100			
1INTRY	INITZSCHIA TRYALIONELLA	1			
1COUPL	COCONEIS PLACENTULA	14			
1ACLAN	ACHNANTHES LANCEOLATA	13			
1NAVIP	NAVICULA VIRIDULA	77			
1INUIS	INITZSCHIA DISSIPATA	20			
1INIHOL	INITZSCHIA HOLSATICA	16			
1INACKV	NAVICULA CRYPTOCERPHALA VAR. VENETA	19			
1SYULD	SYNEDRA ULNA VAR. OXYRHYNCHUS	16			
4ANASP	ALPHEA SP.	1			
1SUOVL	SUTRELLA OVALIS	1			
1SUOVA	SUTRELLA OVALIS	6			
1CYMMI	CYMBELLA MINUTA	2			
1SYULN	SYNEDRA ULNA	2			
1FRAVA	FRAGILARIA VAUCHERIIAE	5			
1DIIVUL	DIATOMA VULGAPE	2			
1INILIN	INITZSCHIA LINEARIS	2			
1INIPAL	INITZSCHIA PALEA	3			
1NAMEU	NAVICULA HEUFLEPI	1			
1GINT	GOMPHONEMA INTRICATUM	1			
1CYMMS	CYMBELLA MINUTA VAR. SILESTIACA	1			
1INAPI	INITZSCHIA APICULATA	1			
1GYSPE	GYFOSIGMA SPENCERII	P			
1AMQVP	AMPHIDIA FVALIS	P			
1RHRUS	RHODALDIA MUSCULUS	P			
1SYFAS	SYNEDRA FASCICULATA	P			
1BASPP	BATPACHOSPERMUM SP.	P			

STATION 2 - MIDDLE STATION
NUMBER OF REPLICATES - 3

REPLICATE - A
SAMPLE DATE - 6/30/81

C - 198 V - 125 ML OF - 1480 L - 50 MM W - 1 MM D - 1 MM S - 2 A - 3750 MM2
SUBSTRATE - GLASS SLIDE

LOG NUMBER - 144-122 ANALYST - RD

NUMBER COUNTED

TAXON CODE TAXON DIATOMS PROPORTIONAL COUNT NON-DIATOMS SEDGWICK-RAFTER COUNT

2STITE	STIGFOLONIUM TENUE			P
2CLASP	CLADOPHEA SP.			P
ANAVIP	NAVICULA VIRIDULA	41		
INTLAT	NITZSCHIA LATENS	1		
AMGVIP	AMPHORA GVALIS	2		
IACMIN	ACHNANTHES MINUTISSIMA	31		
ISYULO	SYNEURA ULNA VAR. OXYRHYNCHUS	13		
INTDIS	NITZSCHIA DISSIPATA	62		
INTFUC	NITZSCHIA FRUSTILLUM	101		
INAMEL	NAVICULA MENISCULUS VAR. UPSALIENSIS	1		
INACRY	NAVICULA CRYPTOCEPHALA VAR. VENETA	9		
IACLAN	ACHNANTHES LANCEOLATA	4		
IRHCU	RHODOSPHEA CURVATA	2		
ISYULN	SYNEURA ULNA	2		
IFRAVA	FRAGILARIA VAUCHERIAE	2		
ICUOPL	COCconeTS PLACENTULA	2		
2SCEDU	SCENAPTESUS GLADICICAUDA	2		
ISUCVA	SUTPALLA OVATA	3		
ICOCME	CYCLOTILLA MENEGHINIANA	6		
INIPOL	NITZSCHIA HOLSATICA	2		
INIPAL	NITZSCHIA PALFA	1		
ISYMIN	SYNEURA MINUSCULA	1		
ISYACU	SYNEURA ACUS	4		
ICOCPE	COCconeTS PEDICULUS	3		
IGUOLI	GOMPHONEMA OLIVACEUM	1		
INACRY	NAVICULA CRYPTOCEPHALA	2		
INAMEL	NAVICULA MENISCULUS	2		
INALAN	NAVICULA LANCEOLATA	1		
ISYPAS	SYNEURA FASCICULATA	5		
IPISPP	PINULARIA SP.	1		
IACIAD	ACHNANTHES LANCEOLATA VAR. DURIA	1		
INACAP	NAVICULA CAPITATA	1		
ITHSPP	THALASSIOSIRA FLUVIATILIS	7		
IRHVEN	AMPHORA VENETA	1		
INACIN	NAVICULA CINCTA	1		
INILIN	NITZSCHIA LINEARIS	1		
ICYPMS	CYPRILLA MINUTA VAR. STILESII	1		

STATION 2 - MIDDLE STATION

NUMBER OF REPLICATES - 3

REPLICATE - P

SAMPLE DATE - 043041

C - 209 V - 1/2 ML OF - 1100 L - 50 MM W - 1 MM 0 - 1 MM S - 2 A - 3750 MM2

SUBSTRATE - GLASS SLIDE

LOG NUMBER - 144-123 ANALYST - RD

NUMBER COUNTED

DIATOMS
PROPORTIONAL COUNT SEDGWICK-RAFTER COUNT

TAXON CODE TAXON

1RHCU	RHODOSPHEMIA CURVATA	2	
1CCCP	COCCONEIS PEDICULUS	1	
1DIUV	DIATOMA VULGARE	P	
1NAVIR	NAVICULA VIRIDULA	130	
1NIPUN	NITZSCHIA HUNGARICA	6	
1NIPRU	NITZSCHIA FRUSTULUM	42	
1NAHEL	NAVICULA HEUFLEI	2	
1CCCP	COCCONEIS PLACENTULA	2	
1NIDIS	NITZSCHIA DISSIPATA	10	
1SYULN	SYNEDRA LUNA	12	
1ACIAD	ACHNANTHES LANCEOLATA VAR. DORIA	1	
1ACPIN	ACHNANTHES MINUTISSIMA	12	
1NAHAL	NAVICULA HALOPHILA	2	
1NACRV	NAVICULA CRYPTOCEPHALA VAR. VENETA	12	
1SYFAS	SYNEDRA FASCICULATA	4	
1NACAP	NAVICULA CAPITATA	1	
4JSSPP	OSCELLATORIA SP.	3	
4ANASP	ANARENA SP.	1	
1AMOPV	AMPHORA EVALIS	1	
1SUOVA	SUTRELLA OVATA	1	
1DITEE	DIATOMA TENUE VAR. ELONGATUM	1	
1GGGLI	GOMPHONEMA OLIVACEUM	4	
1CYCHE	CYCLOTHELLA MENEGHINIANA	1	
1SYACU	SYNEDRA ACUS	1	
1THSPP	THALASSIOSIRA FLUVIATILIS	2	
1SYULD	SYNEDRA LUNA VAR. OXYRHYNCHUS	1	

STATION 2 - MIDDLE STATION
NUMBER OF REPLICATES - 3

REPLICATE - C
SAMPLE DATE - 063081

C - 167 V - 125 ML DF - 1180 L - 50 MM W - 1 MM D - 1 MM S - 2 A - 3750 MM2
SUBSTRATE - GLASS SLIDE
LOG NUMBER - 144-124 ANALYST - RD

NUMBER COUNTED

DIATOMS
PROPORTIONAL COUNT SEDGWICK-RAFTER COUNT

TAXON CODE TAXON

1RHCU	RHODOSPHEMIA CURVATA	3	
1CCCP	COCCONEIS PEDICULUS	3	
1NAVIR	NAVICULA VIRIDULA	32	

1SUOVA	SUPIBELLA OVATA	1
1N101S	NITZSCHIA DISSIPATA	50
1N101R	NITZSCHIA FRUSTULUM	101
1N101M	NITZSCHIA HUNGARICA	1
1ACMIN	ACHNANTHES MINUTISSIMA	28
1AMPER	AMPHORA FERPUSSILLA	1
1THSP	THALASSIOSIRA FLUVIATILIS	4
1NAPIN	NAVICULA MINIMA	1
1N101N	NITZSCHIA DENTICULA	1
1NACBV	NAVICULA CRYPTOCEPHALA VAR. VENETA	10
1CYMPS	CYPRIDELLA MINUTA VAR. STILPSIACA	1
1SYULN	SYNDORA ULNA	8
1SYULO	SYNDORA ULNA VAR. DYPHYNCHUS	3
1CYOME	CYCLOTHELLA MENECHINIANA	1
1N101L	NITZSCHIA LINEARIS	1
1GOLLI	GOMPHONNEPA OLIVACEUM	3
1SUANG	SUTRILLA ANGUSTATA	1
1NAPHU	NAVICULA HUFLERI	1
1GOCPL	GOMPHONNEPS PLACENTULA	5
1NANAM	NANANTHES AMPHIOXYS	2
1AGLAN	ACHNANTHES LANCEOLATA	3
1APUVE	APPIDEA (VALIS)	1
1N101P	NITZSCHIA PALFA	1
1NAPPC	NAVICULA PROTRACTA	1
1ACCLAC	ACHNANTHES LANCEOLATA VAR. DUBIA	3
1ACAFF	ACHNANTHES AFFINIS	1
1NANDT	NAVICULA NOTHA	2
1N101P	NITZSCHIA APICULATA	1
1GYSPE	GYPSISMA SPENCERII	1

STATION 3 - WINTER STATION
NUMBER OF REPLICATES - 3

REPLICATE - A
SAMPLE DATE - 063081

C - 252 V - 125 ML OF - 1180 L - 50 MM V - 1 MM D - 1 MM S - 2 A - 3750 MM2
SUBSTRATE - GLASS SLIDE

LOG NUMBER - 144-12 ANALYST - RD

TAXON CODE		TAXON	NUMBER COUNTED	
			DIATOMS	NON-DIATOMS
			PROPORTIONAL COUNT	SEGWICK-WATER COUNT
1WCUV	PHOTOCOSPHERIA CURVATA		2	
1CAAP	CALONEIS AMPHISPAENA		3	
1SYULN	SYNDORA ULNA		24	
1SUOVL	SUPIBELLA OVATA		83	
1NAPIN	NAVICULA MINIMA		103	
1N101L	NITZSCHIA LINEARIS		52	
1N101S	NITZSCHIA DISSIPATA		20	
1N101R	NITZSCHIA FRUSTULUM		2	
1N101M	NITZSCHIA HUNGARICA		4	

IACHIN	ACHNANTHES MINUTISSIMA	6
ISUGVL	SYNEDRA ULNA VAP. OXYRHYNCHUS	6
INIFAL	NITZSCHIA PALEA	8
ACHPUS	RHOPOLODIA MUSCULUS	5
INIHUN	NITZSCHIA HUNGARICA	17
ITHSPP	THALASSIOSIRA FLUVIATILIS	37
INACRV	NAVICULA CRYPTOCEPHALA VAR. VENETA	13
INIFRU	NITZSCHIA FRUSTULUM	26
INILAT	NITZSCHIA LATENS	1
ISUCVA	SUTRELLA OVATA	2
LENPAL	ENTOMONEIS PALUDOSA	3
IOIVUL	DIATOMA VULGARE	2
ANAMEU	NAVICULA HEUFLERI	2
ICYCFE	CYCLOTELLA MENECHMINIANA	5
ISYFAS	SYNEDRA FASCICULATA	3
IACLAN	ACHNANTHES LANCEOLATA	2
INACRY	NAVICULA CRYPTOCEPHALA	2
INANAP	PANTZSCHIA AMPHIOXYS	1
INANOT	NAVICULA NOTHA	1

STATION 3 - HUNTER STATION
NUMBER OF REPLICATES - 3

REPLICATE - B

SAMPLE DATE - 063041

C - 272 V - 125 ML DF - 1180 L - 50 MM W - 1 MM D - 1 MM S - 2 A - 3750 MM2

SURSTRATE - GLASS SLIDE

LOG NUMBER - 144-126 ANALYST - RD

NUMBER COUNTED

TAXON CODE	TAXON	DIATOMS		NON-DIATOMS
		PROPORTIONAL COUNT	SEDGWICK-RAFTER COUNT	

ISUGVL	SUTRELLA OVALIS	50		
INIFRU	NITZSCHIA FRUSTULUM	27		
INACRV	NAVICULA CRYPTOCEPHALA VAR. VENETA	7		
INILIN	NITZSCHIA LINEARIS	36		
INIPAL	NITZSCHIA PALEA	14		
ISYFAS	SYNEDRA FASCICULATA	6		
INIHUN	NITZSCHIA HUNGARICA	19		
ISYPAR	SYNEDRA PARASITICA	1		
ICYCFE	CYCLOTELLA MENECHMINIANA	4		
IGOOGLI	GEOPHONEMA OLIVACEUM	1		
INAMEU	NAVICULA HEUFLERI	1		
ISYULN	SYNEDRA ULNA	19		
IACLAC	ACHNANTHES LANCEOLATA VAR. DUBIA	2		
ITHSPP	THALASSIOSIRA FLUVIATILIS	100		
INAVIP	NAVICULA VIRIDULA	34		
IPISPP	PINUSULARIA SP.	1		
40SSPP	GOSCIUTERIA SP.			1
ISYACU	SYNEDRA ACUS	4		
ISUGVA	SUTRELLA OVATA	1		

ICUCPL	COCconeis PLACENTULA	1
ICOCPE	COCconeis PFOICULUS	1
INIDIS	NITZSCHIA DISSIPATA	4
INANOT	NAVICULA NOTHA	3
IACHIN	ACHNANTHES MINUTISSIMA	6
ICRAAF	CALONEIS AMPHISRAENA	2
IOIVUL	DIATOMA VULGARF	1
IGVSPE	GYROSIGMA SPENCERII	1

STATION 3 - HUNTER STATION
NUMBER OF REPLICATES - 3

REPLICATE - C
SAMPLE DATE - 0520P1

C - 314 V - 125 μ L OF - 1100 L - 50 MM W - 1 MM D - 1 MM S - 2 A - 3750 NM2
SUBSTRATE - GLASS SLIDE

LOG NUMBER - 144-127 ANALYST - RD

NUMBER COUNTED

TAXON CODE	TAXON	DIATOMS PROPORTIONAL COUNT	NON-DIATOMS SEDGWICK-WATFET COUNT
ICAAAP	CALONEIS AMPHISRAENA	6	
INANGT	NAVICULA NOTHA	3	
INILIN	NITZSCHIA LINEARIS	14	
ISYFAS	SYNEOPA FASCICULATA	4	
ITSPSP	THALASSIOSIRA FLUVIATILIS	103	
INAVIA	NAVICULA VIRIDULA	22	
INIPAL	NITZSCHIA PALFA	22	
INIDIS	NITZSCHIA DISSIPATA	10	
IACHIN	ACHNANTHES MINUTISSIMA	14	
ISDUEV	SLIPPELLA OVALIS	14	
INIPAD	NITZSCHIA FRUSTULUM	2	
ISTULM	SYNEOPA ULNA	21	
INITHUN	NITZSCHIA HUNGARICA	5	
ICOCME	CYCLITELLA MENECHMINIANA	10	
ISTOLO	SYNEOPA ULNA VAR. OXYRHYNCHUS	2	
INIGOT	NITZSCHIA ORTUSA	1	
IOIVUL	DIATOMA VULGARF	1	
ISTACU	SYNEOPA ACUS	2	

PERIPHYTON BRANCH SHEET

CATHEDRAL BLUFFS SHALE OIL COMPANY
PICEANCE CREEK

STATION 1 - STEWART STATION
NUMBER OF REPLICATES - 3

REPLICATE - A
SAMPLE DATE - 0730R1

C - 118 V - 125 ML OF - 149 L - 50 MM W - 1 MM D - 1 MM S - 2 A - 3750 MM2

SUBSTRATE - GLASS SLIDE

LOG NUMBER - 144-137 ANALYST - RD

NUMBER COUNTED

TAXON CODE TAXON DIATOMS PROPORTIONAL COUNT SEDGWICK-RAFTER COUNT NON-DIATOMS

103CPE	COCconeis PEDICULUS	16			
1RHCUR	RHICOSPHERIA CURVATA	100			
4ANASP	ANARAENA SP.			4	P
2PALCH	PALMELLA STAGE OF CHAETOPHORACEAE				
1ACLAC	ACHAETES LANCEOLATA VAR. DURIA	6			
1NAVIR	NAVICULA VIRIDULA	23			
1NIDIS	NITZSCHIA DISSIPATA	17			
1GANG	GOMPHONEPA ANGUSTATUM	7			
1GOSUB	GOMPHONEPA SUBTAVATUM	10			
1NIFRL	NITZSCHIA FRUSULUM	61			
1CYCHE	CYCLOTELLA MENCHINIANA	4			
1ACPIN	ACHAETES MINUTISSIMA	50			
1SUGVA	SUTPELLA OVATA	1			
1RHUS	RHOPALODIA MUSCULUS	4			
1COCPL	COCconeis PLACINTULA	57			
1NARHY	NAVICULA RHYNCHOCEPHALA	5			
1CYFMS	CYRELLA MINUTA VAR. STILESIACA	13			
1MAGRE	MASTIGLOIA GREVILLEI	1			
1NILLI	NITZSCHIA LINEARIS	2			
1CYMSI	CYRELLA SINUATA	4			
1SYFAS	SYNEOPA FASCICULATA	2			
1SYULO	SYNEOPA ULNA V.P. OXYRHYNCHUS	7			
1NIPAL	NITZSCHIA PALEA	1			
1SYULN	SYNEOPA ULNA	4			
1NAHEU	NAVICULA HEUFELERI	2			
1SUCVL	SISTRELLA OVALIS	1			
1ERAVA	FRASILLADIA VAUCHERIAE	1			
1NAFRO	NAVICULA PENTRACTA	1			
1NIAPI	NITZSCHIA APICULATA	P			
4NCIM	ANARAENA CIRCINALIS			9	
4PHSPP	PHORMIDIUM SP.			10	

STATION 1 - STEWART STATION

NUMBER OF REPLICATES - 3

REPLICATE - R
SAMPLE DATE - 073081

C - 142 V - 125 ML OF - 1149 L - 50 MM W - 1 MM D - 1 MM S - 2 A - 3750 MM2

SUBSTRATE - GLASS SLIDE

LOG NUMBER - 144-136 ANALYST - RD

NUMBER COUNTED

TAXON CODE TAXON DIATOMS PROPORTIONAL COUNT SEDGWICK-RAFTER COUNT NON-DIATOMS

2PALCP	PALMELLA STAGE OF CHARTOPHORACEAE	4	31	
1COOPE	COCCONEIS PEDICULUS			
4ANASP	ANASPA SP.	P	1	
1FRACH	FRAGILIARIA CROTOMENSIS			
1ACPIN	ACANTHES MINUTISSIMA	100		
1ACAFF	ACANTHES AFFINIS	1		
1CMMMS	CYRAMELLA MINUTA VAR. SILESIACA	3		
1NIFRU	NITZSCHIA FRUSTULUM	60		
1NIDIS	NITZSCHIA DISSIPATA	13		
1NAVIR	NAVICULA VIRIDULA	16		
1NAMEL	NAVICULA HEUFLEI	2		
1PRAVA	FRAGILIARIA VAUCHERIAE	1		
1SYACU	SYNECDA ACUS	2		
1COOPL	COCCONEIS PLACENTULA	70		
1NHLUR	SPICOSPHERIA CURVATA	18		
1ACLAG	ACANTHES LANCEOLATA VAR. DURIA	12		
1GJOLI	GOMPHONEMA OLIVACEUM	1		
1SYEDPA	SYNECDA ULNA	2		
1NIPAL	NITZSCHIA PALFA	9		
1NANGT	NAVICULA NOTHA	1		
1GGANG	GOMPHONEMA ANGUSTATUM	3		
1STASP	STATHONONIS SMITHII	1		
1NACRV	NAVICULA CRYPTOCOPHALA VAR. VENETA	4		
1NARHY	NAVICULA RHYNCHOCEPHALA	2		
1SUOVL	SULVIRELLA OVALIS	1		
1AMPER	AMPHIDPA PERPUSILLA	1		
1NILLIN	NITZSCHIA LINEARIS	1		
4ANCLP	ANASPA CIRCINALIS		6	
4PHSPP	PHODINUM SP.		2	

STATION 1 - STEWART STATION

NUMBER OF REPLICATES - 3

REPLICATE - C

SAMPLE DATE - 073081

C - 202 V - 125 ML OF - 1149 L - 50 MM W - 1 MM D - 1 MM S - 2 A - 3750 MM2

SUBSTRATE - GLASS SLIDE

LOG NUMBER - 144-136 ANALYST - RD

NUMBER COUNTED

TAXON CODE TAXON DIATOMS PROPORTIONAL COUNT SEDGWICK-RAPTER COUNT NON-DIATOMS

2PALCH	PALVELLA STAGE OF CHAETOPHORACEAE		34	
4MSP	AMSAENA SP.		1	
100CP	COCONEIS PEDICULUS	14		
20CLASP	CLATHROCEA SP.		P	
1MCHUR	PHRIGOSPHERIA CURVATA	35		
1MANT	NAVICULA NOTHA	8		
100CPL	COCONEIS PLACENTULA	71		
1MHEU	NAVICULA HEUFLEI	5		
1MFRU	NAVITZSCHIA FRUSTULUM	100		
1MDOIS	NAVITZSCHIA DISSIPATA	55		
1MPSI	CYMBELLA STINGATA	1		
1MCRV	NAVICULA CRYPTOCOPHALLA VAR. VENETA	2		
1MPCI	CYMBELLA CISTULA	2		
1MMEU	NAVICULA MENISCULUS VAR. UPSALIENSIS	4		
1MPPR	AMPHIPA PERPUSILLA	3		
1MVR	NAVICULA VIRIDULA	5		
1MTHU	NAVITZSCHIA HUNGARICA	1		
1MCLAU	ACHNANTHES LANCEOLATA VAR. DUBIA	24		
1MPL	NAVITZSCHIA PALEA	4		
1MCM	ACHNANTHES MINUTISSIMA	76		
1MYUN	SYRFOEA ULNA	2		
1MDOVA	STILOPHELLA OVATA	1		
1MPEL	NAVICULA PELLICULOSA	12		
1MRAVA	FRAGILAPLIA VAUCHERIAE	1		
1MACIN	NAVICULA CINCTA	1		
1MANAM	NAVITZSCHIA AMPHINOXYS	1		
1MYULD	SYRFOEA ULNA VAR. OXYRHYNCHUS	2		
1MOSUR	COCONEIS SURCLAVATUM	6		
1MYMI	CYMBELLA MINUTA	1		
1MGOOL	COCOPHONEMA OLIVACEUM	6		
1MYHMS	CYMBELLA MINUTA VAR. SILESIAEA	2		
1MIVUL	DIATOMA VULGAPE	1		
1MGAAG	COCOPHONEMA ANCUSTATUM	3		
1MILIN	NAVITZSCHIA LINEAPIS	1		
4PHSPP	PHOSPHIDIUM SP.		33	

STATION 2 - MIDDLE STATION
NUMBER OF REPLICATES - 3

REPLICATE - A
SAMPLE DATE - 073081

C - 772 V - 125 ML DF - 1149 L - 50 MM W - 1 MM D - 1 MM S - 2 A - 3750 MM2
SUBSTRATE - GLASS SLIDE
LOG NUMBER - 144-140 ANALYST - RD

NUMBER COUNTED

TAXON CODE TAXON DIATOMS PROPORTIONAL COUNT SEDGWICK-RAPLEY COUNT NON-DIATOMS

20RAPA	DRAPARNALOIDA SP.		P
2CLASP	CLADOPHORA SP.		6
101VUL	DIATOMA VULGARE	3	
4ANASP	ANARAENA SP.		2
40SSPP	OSCILLATORIA SP.		P
10JANG	GOMPHONEMA ANGUSTATUM	25	
10HOUR	HEGICOSPHEMIA CURVATA	19	
1ACPIA	ACANTHES MINUTISSIMA	111	
10IFRU	NITTSCHIA FRUSTULUM	68	
1ANALN	NAVICULA LANCEOLATA	1	
1PRAVA	FRAGILARIA VAUCHEPIAE	1	
1SYACU	SYNEDRA ACUS	4	
1SYFAS	SYNEDRA FASCICULATA	3	
1SYULD	SYNEDRA LUNA VAR. OXYRHYNCHUS	3	
10YPPS	CYRIFLUA MINUTA VAR. SILESIACA	6	
1SYMIN	SYNEDRA MINUSCULA	1	
10CYME	CYCLotella MENECHINIANA	3	
1NIDIS	NITTSCHIA DISSIPATA	1	
1NACRV	NAVICULA CRYPTOCERHALA VAR. VENETA	1	
10YHSI	CYRIFLUA SINGUATA	5	
10HGIR	HEGICOSPHEMIA GIBBERULA	1	
10GULI	GOMPHONEMA OLIVACEUM	2	
10AVIR	NAVICULA VIPILOULA	1	
10ACLO	ACANTHES LANCEOLATA VAR. OUBIA	3	
10CCPL	COCconeis PLACENTULA	1	
10GUSUR	GOMPHONEMA SURCLAVATUM	7	
10IHUN	NITTSCHIA HUNGARICA	1	
10PSOR	EPITHemia SOREX	P	
10MGIV	HEGICOSPHEMIA GIRRA	P	
10STRAS	STEPHANODISCUS ASTREA	2	
10MSPP	PLUMULIDILUM SP.		8
10ANGCP	ANARAENA CIRCINALIS		5

STATION 2 - MIDDLE STATION
NUMBER OF REPLICATES - 3

REPLICATE - P
SAMPLE DATE - 07/30/61

C - 313 V - 125 ML DF - 1490 L - 50 MM V - 1 MM 0 - 1 MM 5 - 2 A - 3750 MM2
SUBSTRATE - GLASS SLIDE

LOG NUMBER - 144-141 ANALYST - MC

NUMBER COUNTED

TAXON CODE TAXON DIATOMS PROPORTIONAL COUNT SEDGWICK-RAPLEY COUNT NON-DIATOMS

TAXON CODE	TAXON	CLADOPHORA SP.	18
2CLASP	CLADOPHORA SP.		
2PALCH	PALVELLA STAGE OF CHAETOPHORACEAE		
2CLUSP	CLUSTERIUM SP.		P
2SPISP	SPIROGYRA SP.		P
10IVUL	DIATOMA VULGARF	3	
10AVIR	NAVICULA VIRIDULA	12	
10CLUR	RHIZOSIPHONIA CURVATA	50	
10MOVP	AMPHORA CVALIS	P	
10CYME	CYCLOTELLA MENEGHINIANA	17	
4PHSPP	PHORMIDIUM SP.	4	
10IFRU	NITZSCHIA FRUSTULUM	52	
10VACL	SYNEORA ACUS	7	
10IDIS	NITZSCHIA DISSIPATA	1	
10ACAD	ACHNANTHES LANCEOLATA VAR. DUBIA	9	
10COPL	CECCONEIS PLACENTULA	1	
10ACMIN	ACHNANTHES MINUTISSIMA	100	
10ILIN	NITZSCHIA LINEARIS	2	
10YULN	SYNEORA ULNA	3	
10FRAVA	FRAGILARIA VAUCHERIEAE	10	
10ACRV	NAVICULA CRYPTOCEPHALA VAR. VENEYA	2	
10IPAL	NITZSCHIA PALEA	3	
10YMMS	CYMBELLA MINUTA VAR. SILESIACA	2	
10GOLI	GOMPHONEMA OLIVACEUM	13	
10GUANG	GOMPHONEMA ANGUSTIATUM	2	
10APER	AMPHORA PERPUSILLA	2	
10YULU	SYNEORA ULNA VAR. OXYRHYNCHUS	2	
10COPE	CECCONEIS PEDICELLUS	1	
10YMSI	CYMBELLA SINUATA	1	
10RGIV	RHIZALCOTIA GIAPPA	3	
10YFAS	SYNEORA FASCICULATA	3	
10ACLAN	ACHNANTHES LANCEOLATA	2	
10IHUN	NITZSCHIA HUNGARICA	P	
40NASP	ANABAENA SP.	3	
40ANCIF	ANABAENA CIRCINALIS	6	

STATION 2 - MIDDLE STATION
NUMBER OF REPLICATES - 3

REPLICATE - C
SAMPLE DATE - 072093

C - 344 V - 125 ML DF - 1199 L - 50 MM W - 1 MM D - 1 MM S - 2 A - 3750 MM2
SUBSTRATE - GLASS SLIDE
LOG NUMBER - 144-142 ANALYST - RD

NUMBER COUNTED

TAXON CODE TAXON DIATOMS PROPORTIONAL COUNT SEDGWICK-BAFTER COUNT NON-DIATOMS

10IVUL DIATOMA VULGARF 1
10CLUR RHIZOSIPHONIA CURVATA 3P
10MOVP AMPHORA CVALIS 1

2CLASP	CLADOPHORA SP.			2
1RHGIV	RHOPODODIA GIRRA	P		
2MICSP	MICROSPORA SP.		P	
2SPISP	SPOROPORE SP.		P	
1GOTRU	GOMPHONEPA TRUNCATUM	7		
1NISIF	NITZSCHIA SIGMOIDEA	P		
1COOPE	COCCONEIS PEDICULUS	P		
2STITE	STIGEOCLONIUM TENUE		P	
1PISPP	PINULAWIA SP.	2		
1NACSV	NAVICULA CRYPTOCEPHALA VAR. VENETA	1		
1COOPL	COCONEIS PLACENTULA	3		
1ACHIN	ACHNANTHES MINUTISSIMA	100		
1NIFRU	NITZSCHIA FRUSTULUM	60		
1CYMVS	CYPRIDELLA MINUTA VAR. SILESIACA	7		
1NAVIR	NAVICULA VIRIDULA	9		
1AMPER	AMPHOVA PERPUSILLA	4		
1NANOT	NAVICULA NOTHA	1		
1NIPAL	NITZSCHIA PALFA	1		
1NEMEU	NAVICULA MENISCULUS VAR. UPSALIENSIS	2		
1ACLAU	ACHNANTHES LANCEOLATA VAR. DUBIA	4		
1NILIN	NITZSCHIA LINEARIS	2		
1STEAS	STIPHRONOPISCUS ASTREA	5		
1CYCHE	CYCLITELLA MENEGHINIANA	12		
1NIGIS	NITZSCHIA DISSIPATA	3		
1GOANG	GOMPHONEMA ANGUSTATUM	22		
1SYLLN	SYNEDRA ULNA	1		
1SYULO	SYNEDRA ULNA VAR. OXYRHYNCHUS	1		
1GJULL	GOMPHONEMA OLIVACEUM	1		
1NALAN	NAVICULA LANCEOLATA	4		
1RMUS	RHOPODODIA MUSCULUS	1		
1SYACU	SYNEDRA ACUS	2		
1RHGIV	RHOPODODIA GIRRA	1		
1SULIN	SULFIDILLA LINEARIS	1		
1THSPP	THALASSIOSIRA FLUVIATILIS	P		
1SUOVA	SUMIRELLA OVATA	P		
4PHSPP	PHORMIDIUM SP.			26
2SCEOU	SCENECESPUS QUADRICAUDA			2

STATION 3 - WINTER STATION
NUMBER OF REPLICATES - 3

REPLICATES - A
SAMPLE DATE - 073081

C - 561 V - 125 ML OF - 1190 L - 50 MM V - 1 MM D - 1 MM S - 2 A - 3750 MM2
SUBSTRATE - GLASS SLIDE

LOG NUMBER - 144-143 ANALYST - RD

NUMBER COUNTED

TAXON CODE TAXON DIATOMS NON-DIATOMS
PROPORTIONAL COUNT SEDGWICK-WATERS COUNT

2MICSP MICROSPORA SP.

P

1ANOV	APPDRA DVALIS	P	
1NAVIR	NAVICULA VIRIDULA	10	
1NHCUR	RHOICOSPENIA CURVATA	10	
2DAPAP	DAPARNALDIA SP.		P
2STITE	STIGEOCLENIUM TENUE		P
1ACMIN	ACHNANTHES MINUTISSIMA	100	
1NIDIS	NITZSCHIA DISSIPATA	12	
1ACLAD	ACHNANTHES LANCEOLATA VAR. DUBIA	2	
1SYACU	SYNEDRA ACUS	2	
1NIFRU	NITZSCHIA FRUSTULUM	14	
1GJANG	GOMPHONEMA ANGUSTATUM	2	
1GJOLI	GOMPHONEMA OLIVACEUM	5	
1AMPER	APPDRA FERUSILLA	1	
1NACRY	NAVICULA CRYPTOCEPHALA VAR. VENETA	4	
1PRAVA	FACILIAMIA VAUCHERIAE	1	
1CYCHE	CYCLOTELLA HENEGHINIANA	3	
1SYULN	SYNEDRA ULNA	1	
1NAMEDU	NAVICULA MENISCULUS VAR. UPSALIENSIS	1	
1CYHSTI	CYPRIDELLA SINUATA	1	
1OIVUL	DIATOMA VULGARF	1	
1NANCT	NAVICULA NOTHA	P	
1NAMEDU	NAVICULA HEUFLEPI	P	
1CYHMS	CYPRIDELLA MINUTA VAR. STILESIACA	1	
1COCPPL	COCconeis PLACENTULA	1	
1NIPAL	NITZSCHIA PALEA	1	
1SUOVA	SILTRIFELLA OVATA	1	
1GJINT	GOMPHONEMA INTRICATUM	P	
1NARMY	NAVICULA RHYNCHOCEPHALA	P	
2CLASP	CLADOPHOEA SP.	2	
4ANCIF	ANARAENA CIRCINALIS	6	
4PHSPP	PERFRIDIUM SP.	6	

STATION 3 - HUNTER STATION
NUMBER OF REPLICATES - 3

REPLICATE - F
SAMPLE DATE - 0730-1

C - 568 V - 125 ML OF - 1000 L - 50 MM W - 1 MM D - 1 MM S - 2 A - 3750 MM2
SUBSTRATE - GLASS SLIDE

LOG NUMBER - 144-144 ANALYST - RD

NUMBER COUNTED

TAXON CODE	TAXON	DIATOMS PROPORTIONAL COUNT	NON-DIATOMS SEDGWICK-RAFTER COUNT
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1RHCUP	RHOICOSPENIA CURVATA	4	
2STITE	STIGEOCLENIUM TENUE		P
2MICSP	MICROSPORA SP.		P
1ACMIN	ACHNANTHES MINUTISSIMA	106	
1NIFRU	NITZSCHIA FRUSTULUM	4	
1NIDIS	NITZSCHIA DISSIPATA	6	
1ACLAD	ACHNANTHES LANCEOLATA VAR. DUBIA	7	

INAVIP	NAVICULA VIRIDULA	5
IGANG	GEMPHONEMA ANGUSTATUM	5
INACV	NAVICULA CRYPTOCEPHALA VAR. VENETA	3
ICPMS	CYPRELLA MINUTA VAR. SILESIACA	1
ISTULN	SYMPLEURA ULNA	1
IPPAVA	FRAGILARIA VAUCHERIAE	1
INAEU	NAVICULA HEUFLERT	P
ICOCPL	COCconeis PLACENTULA	P
INIPAL	NITZSCHIA PALEA	P
ITMSPP	THALASSIOSIRA FLUVIATILIS	P
IGDULI	GEMPHONEMA OLIVACEUM	P
INICOL	NITZSCHIA HOLSATICA	P
ICYCHE	CYCLOTELLA MENECHINIANA	P
ISYFAS	SYMPLEURA FASCICULATA	P
ISYALU	SYMPLEURA ACUS	P
ISUOVA	SILICIFLUA OVATA	P
IANPGR	AMPHORA PERPUSILLA	P
INAPRO	NAVICULA PROTRACTA	P
INIHUN	NITZSCHIA HUNGARICA	P
4ANCIP	ANARENA CIRCINALIS	5

STATION 3 - HUNTER STATION
NUMBER OF REPLICATES - 3

REPLICATE - C
SAMPLE DATE - 073091

C - 469 V - 125 ML OF - 1199 L - 50 MM W - 1 MM D - 1 MM S - 2 A - 3750 MM2
SUBSTRATE - CLASS SLIDE

LOG NUMBER - 144-145 ANALYST - RD

NUMBER COUNTED

TAXON CODE	TAXON	DIATOMS PROPORTIONAL COUNT	NON-DIATOMS SEDGWICK-KANTER COUNT
2CLASP	CLADOPHORA SP.		
2STITE	STIGEOCLONIUM TENUE		P
4ANASP	ANARENA SP.		P
1ACMIN	ACHNANTHES MINUTISSIMA	101	
1NIFRU	NITZSCHIA FRUSTULUM	14	
1NIOIS	NITZSCHIA DISSIPATA	7	
1RHGUR	RHODOSPHECIA CURVATA	12	
1GUANG	GEMPHONEMA ANGUSTATUM	16	
1NAVIR	NAVICULA VIRIDULA	1	
1COCPL	COCconeis PLACENTULA	1	
1VALIN	NAVICULA LANCEOLATA	1	
1NIFAL	NITZSCHIA PALEA	1	
1ACLOD	ACHNANTHES LANCEOLATA VAR. DUBIA	4	
1HAPPG	NAVICULA PROTRACTA	1	
1CYCHE	CYCLOTELLA MENECHINIANA	1	
1NACPV	NAVICULA CRYPTOCEPHALA VAR. VENETA	1	
1GDUOL	GEMPHONEMA OLIVACEUM	3	
1STULN	SYMPLEURA ULNA	1	

INAMEU	NAVICULA MENISCULUS VAR. UPSALIENSIS	
ICYMMS	CYPRIDELLA MINUTA VAR. SILESTIACA	1
INARHY	NAVICULA RHYNCHOCEPHALA	1
IGJSUB	GOMPHONEMA SURCLAVATUM	P
INACIN	NAVICULA CINCTA	P
ICOCPE	COCCONEIS PEDICULUS	1
JOINSP	DINORBYON SP.	6
ANACIR	ANABAEANA CIRCINALIS	

PERIPHYTON REACH SHEET

CATHEDRAL BLUFFS SHALE OIL COMPANY
PICEANCE CRECK

STATION 1 - STEWART STATION
NUMBER OF REPLICATES - 3

REPLICATE - A
SAMPLE DATE - 043181

C - 162 V - 125 ML OF - 1:99 L - 50 MM W - 1 MM D - 1 MM S - 2 A - 3750 MM2

SUBSTRATE - GLASS SLIDE

LOG NUMBER - 144-155 ANALYST - RD

NUMBER COUNTED

TAXON CODE TAXON DIATOMS PROPORTIONAL COUNT SEDG-ICK-RAFTER COUNT NON-DIATOMS

2SPISP	SPIROGYRA SP.			P
1DIIVUL	DIATOMA VULGARE	13		P
2MICSP	MICROSPORA SP.			40
2DRAPA	DEAPARNALITA SP.			P
2CLAGL	CLADOPHORA GLOMERATA	4		
1RAGIV	RHIZALODIA GIRRA	35		
1INDIS	INITISCHIA DISSIFATA	47		
1GOANG	GOMPHONEA ANGUSTATUM	34		
1NIPAL	NITZSCHIA PALEA	3		
1NAPRO	NAVICULA PROTRACTA	100		
1NIFRU	NITZSCHIA FRUSTULUM	32		
1COCPL	COCOTREIS PLACENTULA	21		
1SYACU	SYNEORA ACUS	24		
1NIFIN	NITZSCHIA LINEARIS	2		
1FRACV	FRATILARIA CONSTRUENS VAR. VENETA	24		
1SYFAS	SYNEORA FASCICULATA	22		
1NACRV	NAVICULA CRYPTOCEPHALA VAR. VENETA	2		
1NIGN	NITZSCHIA IGNORATA	30		
1NIMOL	NITZSCHIA HOLSATICA	3		
1FZACA	FRATILARIA CAPUCINA	11		
1NARHY	NAVICULA RHYNCHOCEPHALA	11		
1NAVIA	NAVICULA VIRGICULA VAR. AVENACEA	2		
1NHEU	NAVICULA HEUFLEI	3		
1NASEA	NAVICULA SECRETA VAR. APTICULATA	10		
1GOSUS	GOMPHONEA SUPCLAVATUM VAR. UPSALIENSIS	5		
1ACHIN	ACHANTHES PINUTISSIMA	7		
1SYULO	SYNEORA ULNA VAR. TRYPHYNCHUS	6		
1CYCME	CYCLOCELLA MENEGHINIANA	8		
1CPTMS	CYRCELLA MINUTA VAR. SILESIACA	5		
1IMHUC	PHOTICOSPHEMIA CURVATA	4		
1NACIN	NAVICULA CINCTA	4		
1COCPE	COCOTREIS PEDICULUS	1		
1NASAI	NAVICULA SALINAFUM VAR. INTERMEDIA	14		
1FRARA	FRATILARIA VAUCHERIAE	7		
1NITHUN	NITZSCHIA HINECAPTA	1		
1CYPTU	CYRCELLA TUMIDA	4		
1SYULA	SYNEORA ULNA	1		
1EPSUX	EPITHYRIA SOPEX			

1AC1AD	ACHNANTHES LANCEOLATA VAR. DUBIA	3
1RHMS	RHOPALODIA MUSCULUS	3
1NANOI	NAVICULA NOTHA	6
1CYMOC	CYNELLA MICROCEPHALA	1
1ACAFI	ACHNANTHES AFFINIS	1
1NACRY	NAVICULA CRYPTOCEPHALA	1
1GURLI	GOMPHONEMA OLLIVACEUM	4
1NALAN	NAVICULA LANCEOLATA	1
1FRACR	FRAGILARIA CRYPTONENSIS	16

STATION 1 - STEWART STATION
NUMBER OF REPLICATES - 3

REPLICATE - P
SAMPLE DATE - 083181

C - 252 V - 125 ML OF - 1449 L - 50 MM W - 1 MM D - 1 MM S - 2 A - 3750 MM2
SUBSTRATE - GLASS SLIDE

LOG NUMBER - 144-156 ANALYST - RO

NUMBER COUNTED

TAXON CODE	TAXON	DIATOMS PROPORTIONAL COUNT	NON-DIATOMS SEDG-ICK-RAFT-P COUNT
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2DRAPA	DRAPARNALDIA SP.		44
2OESPF	OERSONIUM SP.		P
1COUPE	COCORNETIS PFCICULUS	11	
1PLDEL	PLEUROSIGMA DELICATISSIMA	4	
1NIOIS	NITZSCHIA DISSIPATA	100	
1NIFRU	NITZSCHIA FRUSTULUM	63	
1COCPL	COCORNETIS PLACENTULA	40	
1FRAPA	FRAGILARIA VAUCHERIAE	22	
1NIPAL	NITZSCHIA PALEA	53	
1NAVIA	NAVICULA VIRIDULA VAR. AVERNACEA	6	
1FRACR	FRAGILARIA CRYPTONENSIS	46	
1SYLLO	SYNEDRA ULNA VAR. OXYRHYNCHUS	8	
1GOANG	GOMPHONEMA ANGUSTIATUM	26	
1GOINT	GOMPHONEMA INTRICATUM	3	
1NILIN	NITZSCHIA LINIFRIS	21	
1ASFOP	ASTERIONELLA FORMOSA	1	
1RHMS	RHOPALODIA MUSCULUS	7	
1CYMMS	CYNELLA MINUTA VAR. SILESIACA	9	
1ACMIN	ACHNANTHES MINUTISSIMA	7	
1NIGN	NITZSCHIA IGNOBATA	3	
1RHGLV	RHOPALODIA GIPRA	3	
1NAHEU	NAVICULA HEUFLEI	4	
1GOOLI	GOMPHONEMA OLLIVACEUM	3	
1SYACU	SYNEDRA ACUS	7	
1CYCHL	CYCLOTELLA MENOPHINIANA	4	
1NACIA	NAVICULA CINCTA	2	
1AC1AC	ACHNANTHES LANCEOLATA VAR. DUBIA	7	
1NINH1	NITZSCHIA HOESATICA	78	
1SYULN	SYNEDRA ULNA	5	

INACKV	NAVICULA CRYPTOCEPHALA VAR. VENETA	11
INAGOM	NITTSCHIA ROMANA	1
ICVMSI	CYMBELLA SINUATA	2
IGOSUS	GOMPHONEMA SUBCLAVATUM VAR. UPSALIENSIS	2
INAPEL	NAVICULA PELLICULOSA	1
INARHY	NAVICULA RHYNCHOCEPHALA	4
IRHCUP	RHOICOSPHEMIA CURVATA	6
INANOT	NAVICULA NOTHA	1
INITHUN	NITTSCHIA HUNGARICA	7
IFRACA	FRAGILARIA CAPUCINA	2
ISYFAS	SYNEORA FASCICULATA	1
INALAN	NAVICULA LANCEOLATA	1
IEFSOR	EFITHEMIA SOREY	1
INAPYG	NAVICULA PYGMAEA	1
INAPRO	NAVICULA PROTRACTA	1
INAMAL	NAVICULA MALOPHILA	1
ISYPAR	SYNEORA PAPASITICA	1
IDIVUL	DIATOMA VULGARE	2
ISYAIN	SYNEORA PINUSCULA	3
IDEELE	CEFTICULA ELEGANS	1
INAAHV	NAVICULA ARAVENSIS	1
ANARAS	ANARAENA SP.	5

STATION 1 - STEWART STATION
NUMBER OF REPLICATES - 3

REPLICATE - C
SAMPLE DATE - 083181

C - 467 V - 125 ML DF - 149 L - 50 PH W - 1 MM D - 1 MM S - 2 A - 3750 MM2
SUBSTRATE - GLASS SLIDE

LOG NUMBER - 144-157 ANALYST - RO

NUMBER COUNTED

TAXON CODE	TAXON	DIATOMS PROPORTIONAL COUNT	NON-DIATOMS SEDGWICK-HAFTER COUNT
2SPISP	SPIROGYRA SP.		P
2ORAPA	ORARNALDIA SP.		35
2PICSP	PICOSPORA SP.		P
IRHCUP	RHOICOSPHEMIA CURVATA	1	
IDIVUL	DIATOMA VULGARE	1	
4NUSPP	NCSTOC SP.		P
ISULIN	SULFURELLA LINEARIS	P	
ICVELL	CYRATOPLEURA FLUITICA	1	
IFRACP	FRAGILARIA CROTONENSIS	2	
IGUANG	GOMPHONEMA ANGUSTIATUM	30	
INAVIA	NAVICULA VIRIDULA VAR. AVENACEA	12	
ICOCPL	COCconeis PLACENTULA	12	
IEFSUP	EFITHEMIA SOREY	1	
INIPAL	NITTSCHIA PALFA	40	
IFRABA	FRAGILARIA VANCHEPITAF	15	
INIFAU	NITTSCHIA FRUSTULUM	100	

INIDIS	NITZSCHIA DISSIPATA	54
INIHOL	NITZSCHIA HOLSATICA	20
INANOT	NAVICULA NOTHA	2
ICVMS	CYMBELLA MINUTA VAR. STILESII	6
INAPHY	NAVICULA RHYNCHOCEPHALA	6
ISYACU	SYNEDRA ACUS	18
INICOP	NITZSCHIA COMMUNIS	1
INAFEL	NAVICULA PELLICULOSA	1
IACHIN	ACHANTHES MINUTISSIMA	13
ISYOLD	SYNEDRA ILNA VAR. OXYRHYNCHUS	9
INACRV	NAVICULA CRYPTOCEPHALA VAR. VENETA	11
ISYFAS	SYNEDRA FASCICULATA	16
IFRALE	FRAGILARIA LEPTOSTAURON	1
LAMPER	AMPHORA PERPUSILLA	1
IFRACA	FRAGILARIA CAPUCINA	7
IACIAD	ACHANTHES LANCEOLATA VAR. DUBIA	4
IRHAFUS	RHODALDIA MUSCULUS	1
ISYFAR	SYNEDRA PARASTYICA	1
INALAN	NAVICULA LANCEOLATA	1
INAHED	NAVICULA HEUFLEI	1
IGOCUL	GOPHONEMA OLIVACEUM	1
ICVME	CYCLOTELLA MENECHINIANA	7
IPISPF	PINNULARIA SP.	1
ISYULN	SYNEDRA ILNA	4
INILIN	NITZSCHIA LINEARIS	18
INILGN	NITZSCHIA IGNORATA	2
INAMEU	NAVICULA MENISCULUS VAR. UPSALIENSIS	1
ANASEP	ANABAENA SP.	15

STATION 2 - MIDDLE STATION
NUMBER OF REPLICATES - 3

REPLICATE - A
SAMPLE DATE - 083181

C - 762 V - 125 ML DF - 1:49 L - 50 MM W - 1 MM D - 1 MM S - 2 A - 3750 MM2
SUBSTRATE - GLASS SLIDE

LOG NUMBER - 144-156 ANALYST - PD

NUMBER COUNTED

TAXON CODE	TAXON	DIATOMS PROPORTIONAL COUNT	NON-DIATOMS SEOGWICK-KAFER COUNT
INISIE	NITZSCHIA SIGMOIDEA	8	
IDITEF	DIATOMA TENDR VAP. ELONGATUM	54	
IRHCUR	PHOCOSPENIA CURVATA	7	
ICOCPL	COCOSNIS PLACENTULA	7	
ICOCPE	COCOSNIS PEDICELLUS	P	
IFRAVA	FRAGILARIA VALCHERII	7	
ZCLACL	CLADOSPORA GLOMERATA		P
ZMICSP	MICROSPORA SP.		P
IPIDEL	PLIUDISMA DELICATISSIMA	1	
ZCLOSP	CLOSTEPILUM SP.		P

1ANCVP	APHORA OVALIS	P
101VUL	DIATOMA VULGARE	2
1FVACA	FRAGILARIA CROTONEUSIS	100
1CUTPL	GOMPHONEMA TRUNCATUM	2
1SYFAS	SYNEDEA FASCICULATA	7
1NACRV	NAVICULA CRYPTOCEPHALA VAR. VENETA	11
1NIOIS	NITZSCHIA DISSIPATA	8
1GJANG	GOMPHONEMA ANGIUSTATUM	11
1CVELL	CYATOPLEURA ELLIPTICA	1
1SVULN	SYNEDEA ULNA	6
1NAHAL	NAVICULA HALOPHILA	3
1FRACA	FRAGILARIA CAPUCINA	3
1SPUL	SYNEDEA PULCHELLA VAR. LANCEOLATA	12
1QYME	CYCLUTELLA MENEGHINIANA	5
1ACMIR	ACHNANTHES MINUTISSIMA	20
1NIFRL	NITZSCHIA FRUSTILLUM	10
1CVMMS	CYPRILLA MINUTA VAR. STILESII	4
1SVULD	SYNEDEA ULNA VAR. DRYRHYNCHUS	3
1SYACU	SYNEDEA ACUS	14
1NAVIA	NAVICULA VIRIDULA VAR. AVENACEA	2
1GJUSJ	GOMPHONEMA SURCLAVATUM VAR. UPSALIENSIS	1
1NIDEN	NITZSCHIA DENTICULA	1
1NITHUN	NITZSCHIA HUNGARICA	2
1GJOLI	GOMPHONEMA OLIVACEUM	8
1NAPER	APHORPA PAPPUSILLA	1
1NAHEU	NAVICULA HEUFLERT	3
1NILIN	NITZSCHIA LINEAPIS	2
4ANASP	APHORPA SP.	2
4PHSPP	PHORMIDIUM SP.	4
20RAPA	CEADAFENALDIA SP.	5
2SPISP	SPIROGYRA SP.	2

STATION 2 - MIDDLE STATION

NUMBER OF REPLICATES - 3

REPLICATE - R

SAMPLE DATE - 083181

C - 259 V - 125 ML DF - 1499 L - 50 MM W - 1 MM D - 1 MM S - 2 A - 3750 MM2

SUBSTRATE - GLASS SLIDE

LOG NUMBER - 144-159 ANALYST - RD

NUMBER COUNTED

TAXON CODE TAXON DIATOMS PROPORTIONAL COUNT SEDGWICK-RAFTER COUNT NON-DIATOMS

201AGL	CLADOPHORA GLOMERATA	P	
2MICSP	PICOSPORA SP.	P	
20RAPA	CEADAFENALDIA SP.		12
2SPISP	SPIROGYRA SP.		P
1ANCJP	APHORPA CURVATA	10	
1GJTHU	GOMPHONEMA TRUNCATUM	1	
1SYACU	SYNEDEA ACUS	4	

1SYFAS	SYNEDRA FASCICULATA	102
1CCOPE	COCCONEIS PECICILUS	5
1SYUL	SYNEDRA PULCHELLA VAR. LANCEOLATA	10
1SYULN	SYNEDRA ULNA	6
1SYULD	SYNEDRA ULNA VAR. OXYRHYNCHUS	12
1FRACA	FRAGILARIA CAPUCINA	11
1NILIN	NITZSCHIA LINEARIS	9
1NACRA	NAVICULA CRYPTOCEPHALA VAR. VENETA	12
1ACPIN	ACHYRATHES MINUTISSIMA	15
1NIFRU	NITZSCHIA FRUSTULUM	21
1CYCHE	CYCLOTELLA MENEGHINIANA	12
1FRACR	FRAGILARIA CROTONEFENSIS	44
1CCOPL	COCCONEIS PLACENTULA	19
1DITTE	DIATOMA TENUE VAR. FLONGATUM	32
1NIPAL	NITZSCHIA PALEA	7
1NAVIA	NAVICULA VIRIDULA VAR. AVENACEA	5
1CYMYS	CYRELLA PINITA VAR. SILESIACA	12
1NAPED	NAVICULA HEUFELERI	1
1GDIINI	GOMPHONEPA INTRICATUM	1
1FRAVA	FRAGILARIA VAUCHERIAE	5
1AMOPV	AMPHORA CVALIS	1
1NIMOL	NITZSCHIA HOLSATICA	3
1NARHY	NAVICULA RHYNCHOCEPHALA	6
1SUOVA	SUTIRELLA OVATA	1
1HANAM	HANTZSCHIA AMPHIDYVS	1
1NAROT	NAVICULA NOTHA	3
1NIGIS	NITZSCHIA DISSIPATA	3
1GJACU	GOMPHONEPA ACUMINATUM	3
1DIDVL	DIATOMA VULGARE	1
1GGANG	GOMPHONEPA ANGUSTATUM	1
1CYTU	CYRELLA TUMIDA	1
1NIGN	NITZSCHIA IGNORATA	P
1NAMEU	NAVICULA MENISCULUS VAR. UPSALIENSIS	P
4ANASP	ANAZAENA SP.	1
3DINSP	DINORRYON SP.	1

STATION 2 - MIDDLE STATION
NUMBER OF REPLICATES - 3

REPLICATE - C
SAMPLE DATE - 092181

C - 293 V - 125 ML OF - 1:99 L - 50 MM W - 1 MM O - 1 MM S - 2 A - 3750 MM2
SUBSTRATE - GLASS SLIDE

LOG NUMBER - 144-16C ANALYST - RD

NUMBER COUNTED

TAXON CODE TAXON DIATOMS PROPORTIONAL COUNT NON-DIATOMS SEDGWICK-RAFTER COUNT

1PLDEL	PLEUROSIGMA DELICATISSIMA	2
1FRACK	FRAGILARIA CROTONEFENSIS	101
1DITTE	DIATOMA TENUE VAR. FLONGATUM	44

101VUL	DIATOMA VULGARE	2	
101SIE	NITZSCHIA SIGMINEA	P	
101SPP	PINNULARIA SP.	P	
25PISP	SPIROCYRA SP.	P	
25ICSP	MICROSPOPA SP.	P	
20RAPA	DEAPANNALOIDA SP.	12	
4ANASP	ANABAENA SP.	P	
10HCUF	REDICOSPHEMIA CURVATA	1	
15YFAS	SYNEORA FASCICULATA	70	
15YULN	SYNEORA ULNA	P	
15YULN	SYNEORA ULNA VAP. OXYRHYNCHUS	70	
15YACU	SYNEORA ACUS	28	
15YULP	SYNEORA PULCHELLA VAP. LANCEOLATA	4	
1ACIAD	ACHMANTHES LANCEOLATA VAP. DURIA	3	
1FRACA	FRAGILARIA CAPUCINA	18	
1NACRV	NAVICULA CRYPTOCEPHALA VAP. VENETA	15	
1ACHIN	ACHMANTHES MINUTISSIMA	21	
1CYMPS	CYPRELLA MINUTA VAP. STILESII	4	
1INDIS	NITZSCHIA DISSIPATA	16	
1FRAVA	FRAGILARIA VAUCHEPTAE	5	
1NIPOL	NITZSCHIA HOLSATICA	14	
1NILIN	NITZSCHIA LINEARIS	3	
1NIPAL	NITZSCHIA PALEA	18	
1NICOM	NITZSCHIA COMMUNIS	1	
1NAVIA	NAVICULA VIRIDULA VAP. AVENACEA	12	
1NAHEU	NAVICULA HEUFLERI	6	
1CYCME	CYCLotella MENECHINIANA	5	
1GONG	GYPHONEMA ANGUSTATUM	8	
1COCPL	COCCHERIS PLACENTULA	16	
1NIFRU	NITZSCHIA FRUSTULUM	12	
1NANOT	NAVICULA NOTHA	4	
1SYMIN	SYNEORA MINUSCULA	1	
1GGLLI	GYPHONEMA OLIVACEUM	1	
1NARMY	NAVICULA RHYNCHOCEPHALA	2	
1AMPER	AMPHORA PERUSILLA	2	
1NITHUN	NITZSCHIA HUNGARICA	1	
1SUCVL	SUPROPELLA OVALIS	2	
1SUCVA	SUPROPELLA OVATA	1	
1THSPP	THALASSIOSIRA FLUVIATILIS	P	

STATION 3 - HUNTER STATION
NUMBER OF REPLICATES - 3

REPLICATE - A
SAMPLE DATE - 083181

C - 660 V - 125 ML OF - 1199 L - 50 MM W - 1 MM O - 1 MM S - 2 A - 3775 MM2
SUBSTRATE - GLASS SLIDE

LOG NUMBER - 144-161 ANALYST - PD

NUMBER COUNTED

TAXON CODE TAYON DIATOMS NON-DIATOMS
PROPORTIONAL COUNT SEDG#ICK-RAFTER COUNT

TAXON CODE	TAXON	PROPORTIONAL COUNT	DIATOMS	NON-DIATOMS
20RAPA	DRAPARNALDIA SP.			
2CLAGL	CLADOPHORA GLOMERATA			
1RAVIA	NAVICULA VIRIDULA VAR. AVENACEA	6		
1SYULO	SYNEDRA LUNA VAR. OXYRHYNCHUS	1		
2NIDIS	NITZSCHIA DISSIPATA	107		
1GUANG	GOMPHONEMA ANGSTADTUM	15		
1CYCME	CYCLITELLA MENECHINIANA	4		
1SYEAS	SYNEDRA FASCICULATA	3		
1NACRA	NAVICULA CRYPTOCEPHALA VAR. VENETA	7		
1NITRU	NITZSCHIA FRUSTULUM	12		
1CYHMS	CYMBELLA MINUTA VAR. SILESIAICA	3		
1ACHIN	ACHRANTHES MINUTISSIMA	24		
1NIPAL	NITZSCHIA PALFA	4		
1NALAN	NAVICULA LANCEOLATA	1		
1PHCUR	RHODOSPHEMIA CURVATA	1		
1GODLI	GOMPHONEMA FLIVACEUM	1		
1FRAYA	FRAGILARIA VAUCHERIAE	1		
1SYELN	SYNEDRA LUNA	2		
1COCPL	COCconeis PLACENTULA	4		
1ACLAD	ACHRANTHES LANCEOLATA VAR. DUBIA	1		
1NAMIN	NAVICULA MINIMA	1		
1NASEA	NAVICULA SECRETA VAR. APICULATA	5		
1SUOVA	SURIRELLA OVATA	1		
1NICBT	NITZSCHIA GRUSA	1		
1NARYG	NAVICULA PYGMAEA	1		
1NANOT	NAVICULA NOTHA	1		
1THSPP	THALASSIOSIRA FLUVIATILIS	P		
1GOSUS	GOMPHONEMA SURCLAVATUM VAR. UPSALIENSIS	P		
1GYSPH	GYRATIGMA SPENCEPPI	P		
1NTHUN	NITZSCHIA HUNGARICA	P		
1NACIN	NAVICULA CINCTA	P		
1DIVUL	DIATOMA VULGARIS	P		
1RHPUS	RHODALONIA MUSCULUS	P		
1NASPP	NAVICULA SP.	P		
1NABEL	NAVICULA HEUFLERI	P		
4PHSPP	PHORMIDIUM SP.	4		
4ANASP	ANARAENA SP.	2		
4OSSPP	OSCILLATORIA SP.	5		
2SCERU	SCENEDESMUS QUADRICAUDA	1		

STATION 3 - WINTER STATION
NUMBER OF REPLICATES - 3

REPLICATE - P
SAMPLE DATE - 083181

C - 705 V - 125 ML DF - 1:99 L - 50 MM V - 1 MM D - 1 MM S - 2 A - 3750 MM2
SUBSTRATE - GLASS SLIDE
LOG NUMBER - 144-162 ANALYST - RD

NUMBER COUNTED

TAXON CODE TAXON PROPORTIONAL COUNT DIATOMS NON-DIATOMS
SEDGWICK-RATTEW COUNT

2DRAPA	DRAPARNALDIA SP.		
1AMOPV	AMPHORA OVALIS	P	P
1N131F	NITZSCHIA SIGMOIDEA	P	P
1RHOCUR	RHOCCOSPHEMIA CUPVATA	15	
1CYCHE	CYCLOTELLA MENEGHINIANA	10	
4ANASP	ANABENA SP.	1	
101VUL	DIATOMA VULGARE	1	
1GYSPE	GYPOSIGMA SPENCERII	P	
1SUOVL	SLIPPELLA OVALIS	1	
1N101S	NITZSCHIA DISSIPATA	69	
1ACPIN	ACHNANTHES MINUTISSIMA	100	
1SYULN	SYNEDRA ULNA	2	
1COCPL	COCCONIS PLACENTULA	5	
1NAVIA	NAVICULA VIRIDULA VAR. AVENACEA	25	
1SUOVA	SLIPPELLA OVATA	1	
1GOANG	GOMPHONEMA ANGSTADTUM	52	
1CYHMS	CYMBELLA MINUTA VAR. SILESIACA	30	
1N135CA	NAVICULA SECRETA VAR. APICULATA	1	
1N1ATSC	NAVICULA TRIPUNCTATA VAR. SCHIZONEMOIDES	3	
1N1EHL	NITZSCHIA FRUSTULUM	8	
101TEF	DIATOMA TENUE VAR. FLONGATUM	1	
1FRACPF	FRAGILARIA CROTONEFENSIS	1	
1FRAVA	FRAGILARIA VAUCHERIAE	1	
1N1GEN	NITZSCHIA DENTICULA	1	
1GDOLI	GOMPHONEMA OLIVACEUM	10	
1N1HUN	NITZSCHIA HUNGARICA	1	
1N1LIN	NITZSCHIA LINEARIS	1	
1AMPER	AMPHORA PERPUSILLA	5	
1N1HEFL	NAVICULA HEUFELERI	3	
1FRALRE	FRAGILARIA LEPTOSTAURON	1	
1N1AKOT	NAVICULA NITIDA	1	
1N1ACKV	NAVICULA CRYPTOCEPHALA VAR. VENETA	2	
1N1PAL	NITZSCHIA PALEA	2	
1SYULUL	SYN-ORA PULCHELLA VAR. LANCEOLATA	1	
1N1APWC	NAVICULA PROTRACTA	1	
1SUANG	SLIPPELLA ANGSTATA	1	
1ACIAD	ACHNANTHES LANCEOLATA VAR. DUBIA	3	
1CYFST	CYMBELLA SINUATA	1	
1SYULD	SYNEDRA ULNA VAR. OXYRHYNCHUS	P	
1N1ALAN	NAVICULA LANCEOLATA	P	
1GDSUS	GOMPHONEMA SURCLAVATUM VAR. UPSALTENSIS	P	
1KHGIB	PHCOPALDIA GIRREPULA	P	
1NACUS	NAVICULA CUSPIDATA	P	
2SPIIS	SPINOCYRA SP.	1	
4QSSPF	OSCILLATORIA SP.	3	
4PHSPP	PHORMIDIUM SP.	13	

STATION 3 - HUNTER STATION
NUMBER OF REPLICATES - 3

REPLICATE - C
SAMPLE DATE - 083181

C - 925 V - 125 ML DF - 1:90 L - 50 MM W - 1 MM O - 1 MM S - 2 A - 3750 MH2
SUBSTRATE - GLASS SLIDE
LOG NUMBER - 144-142 ANALYST - RD

NUMBER COUNTED

TAXON CODE TAXON DIATOMS PROPORTIONAL COUNT SEDGWICK-RAFTER COUNT NON-DIATOMS

20RAPA	DRAPARNALDIA SP.			P
4ANASP	ANARAENA SP.			P
2CLAGL	CLADOPHORA GLMERATA			P
1N10IS	NITZSCHIA DISSIPATA	56		
1ACVIN	ACHANTHES MINUTISSIMA	100		
1NAVIA	NAVICULA VIRIDULA VAR. AVENACEA	40		
1N1FRU	NITZSCHIA FRUSTULUM	22		
1G0ANG	GCPHONEMA ANGUSTATUM	40		
1CYHMS	CYRSELLA MINUTA VAR. SILESIACA	18		
1NACRV	NAVICULA CRYPTOCEPHALA VAR. VENETA	9		
1NANGT	NAVICULA NOTHA	6		
1G0OLI	GCPHONEMA OLIVACEUM	10		
4M4CUA	RHOICOSPHERIA CURVATA	8		
1CYCHE	CYCLOTELLA MENECHTNIANA	7		
1SUOVL	SURFELLA OVALIS	1		
1NAHEU	NAVICULA HEUFLEI	1		
1C0CPL	COCconeis PLACENTULA	3		
1AMPER	AMPHORA PEPUSILLA	2		
1G0SUS	GCPHONEMA SURCLAVATUM VAR. UPSALIENSIS	5		
1NATSC	NAVICULA TPUNCTATA VAR. SCHIZONEPHOIDES	P		
1SUOVA	SURFELLA OVATA	P		
101VUL	DIATOMA VULGARE	P		
1C0CPE	COCconeis PERICULUS	P		
1N1HUN	NITZSCHIA HUNGARICA	P		
1SYFAS	SYNEORA FASCICULATA	P		
1SYULN	SYNEORA ILNA	P		
1N1LIN	NITZSCHIA LINEARIS	P		
4PHSPP	PHOSPHIDILM SP.			30

PERIPHYTON BENCH SHEET

CATHEDRAL HILLS SHALE OIL COMPANY
PICEANCE CREEK

STATION 1 - STEWART STATION
NUMBER OF REPLICATES - 3

REPLICATE - A
SAMPLE DATE - 093081

C - 210 V - 125 ML DF - 1149 L - 50 MM W - 1 MM D - 1 MM S - 2 A - 3750 MM2
SUBSTRATE - GLASS SLIDE

LOG NUMBER - 144-173 ANALYST - RD

NUMBER COUNTED

TAXON CODE TAXON DIATOMS PROPORTIONAL COUNT SEDGWICK-RAFTER COUNT NON-DIATOMS

1COCPE	COCconeis PEDICULUS	2			
2PALCH	PALVELLA STAGE OF CHAETOPHORACEAE				42
1RHCUK	RHICOSPHEMIA CURVATA	7			
1NAVIR	NAVICULA VIRIDULA	P			
10IVUL	DIATOMA VULGAPE	P			
30INSF	DIAZAPYON SP.				1
1COCPL	COCconeis PLACENTULA	100			
1ACMIN	ACHNANTHES MINUTISSIMA	43			
1CYMMS	CYMBELLA MINUTA VAR. SILESIACA	1			
1ACLAO	ACHNANTHES LANCEOLATA VAR. DURIA	16			
1SYULA	SYNECPHA ULNA	1			
1GUBRG	GOMPHONEPA ANGUSTATUM	5			
1ACLAN	ACHNANTHES LANCEOLATA	1			
1NARHY	NAVICULA RHYNCHOCEPHALA	3			
1NIPAL	NITZSCHIA PALEA	2			
1NAVIA	NAVICULA VIRIDULA VAR. AVENACEA	1			
1NIFRU	NITZSCHIA FRUSTULUM	1			
1GUSUP	GOMPHONEPA SURCLAVATUM	P			
1CYPSI	CYMBELLA SINUATA	P			
1NILAT	NITZSCHIA LATENS	P			
1FRAVA	FRAGILARIA VAUCHERIAE	4			
1CYCHE	CYLOTHELLA MENECHMINIANA	P			
1NIDIS	NITZSCHIA DISSIPATA	P			
1VALAN	NAVICULA LANCEOLATA	P			
4ANASP	ANASTENA SP.				1

STATION 1 - STEWART STATION
NUMBER OF REPLICATES - 3

REPLICATE - R
SAMPLE DATE - 093081

C - 149 V - 125 ML DF - 1149 L - 50 MM W - 1 MM D - 1 MM S - 2 A - 3750 MM2

SUBSTRATE - GLASS SLIDE

LOG NUMBER - 144-174

ANALYST - RD

NUMBER COUNTED

TAXON CODE TAXON DIATOMS PROPORTIONAL COUNT SEDGWICK-RAFTER COUNT NON-DIATOMS

1COCPL	COCconeis PLACENTULA	100	57
2PALCH	PALMELLA STAGE OF CHAETOPHORACEAE		
1NIGN	NITTSCHIA IGNORATA	4	
1ASFGR	ASTERIONELLA FORMOSA	P	
1COCPL	COCconeis PEDICELLUS	P	
1GOANG	GOMPHONEMA ANGUSTATUM	4	
1OIVUL	DIATOMA VULGARE	1	
1FRAVA	FRAGILARIA VAUCHERIAE	1	
1ACLAC	ACHNANTHES LANCEOLATA VAP. DUBIA	65	
1NIDIS	NITTSCHIA DISSIPATA	3	
1NANDI	NAVICULA NOTHA	2	
1NIFRU	NITTSCHIA FRUSTULUM	1	
1NIPAL	NITTSCHIA PALEA	3	
1ACHIN	ACHNANTHES MINUTISSIMA	30	
1CYMSI	CYPRIDELLA SINGATA	3	
1NAVIA	NAVICULA VIRIDULA VAP. AVENACEA	2	
1RHCUA	RHODOSPHECIA CLAVATA	7	
1GDSUB	GOMPHONEMA SUBCLAVATUM	7	
1NAARV	NAVICULA APERVENSIS	1	
1CYFMS	CYPRIDELLA MINUTA VAP. STILESII	3	
1NACRV	NAVICULA CRYPTOCOPHALA VAP. VENETA	1	
1SYNDR	SYNDORA ULNA	10	

STATION 1 - STEWART STATION
NUMBER OF REPLICATES - 3

REPLICATE - C
SAMPLE DATE - 093081

C - 310 V - 125 ML DF - 1449 L - 50 MM W - 1 MM D - 1 MM S - 2 A - 3750 MM2
SUBSTRATE - GLASS SLIDE

LOG NUMBER - 144-175 ANALYST - RD

NUMBER COUNTED

TAXON CODE TAXON DIATOMS PROPORTIONAL COUNT SEDGWICK-RAFTER COUNT NON-DIATOMS

1COCPL	COCconeis PLACENTULA	100	26
2PALCH	PALMELLA STAGE OF CHAETOPHORACEAE		
1FRUKH	FRUSTILLIA PHOMPOIDES	P	

1GQSUB 2
 1ACLAD 37
 1ACHIN 63
 1GQPAR 2
 1NIFRU 4
 1NARHY 2
 1NITON 2
 1NARPV 1
 1RHCUR 1
 1AMPER 1
 1NARHU 2
 1NANJT 1
 1SYULN 1
 1CYPSI 1
 1NIPAL 1
 1AMQUP 1
 1NAVIA 1
 1CYM-S 1

GOMPHONEPA SURCLAVATUM
 ACHNANTHES LANCEOLATA VAR. DUBIA
 ACHNANTHES MINUTISSIMA
 GOMPHONEPA PARVULUM
 NITZSCHIA FRUSTULUM
 NAVICULA RHYNCHOCEPHALA
 NITZSCHIA TENDRATA
 NAVICULA ARVENSIS
 PHCICOSPHEMIA CURVATA
 APPATRA PERPUSILLA
 NAVICULA HEUFLEI
 NAVICULA NOTHA
 SYNEDEA LLNA
 CYMBELLA SINUATA
 NITZSCHIA PALEA
 APPATRA CVALIS
 NAVICULA VIRIDULA VAR. AVENACEA
 CYMBELLA MINUTA VAR. STILESII

STATION 2 - MIDDLE STATION
 NUMBER OF REPLICATES - 3

REPLICATE - A
 SAMPLE DATE - 0230PI

C - 768 V - 125 ML DF - 1:49 L - 50 MM W - 1 MM D - 1 MM S - 2 A - 3750 MM2
 SUBSTRATE - GLASS SLIDE
 LOG NUMBER - 144-176 ANALYST - RD

NUMBER COUNTED

TAXON CODE TAXON DIATOMS PROPORTIONAL COUNT SEDWICK-Rafter COUNT NON-DIATOMS

2PALCH PALMELLA STAGE OF CHAETOPHORACEAE 104
 2CLASP CLADOPHORA SP. P
 2STIE STIGODONCELIUM TENUE P
 1GQCPH GOMPHONEPA PARVULUM 83
 1RHCUR PHCICOSPHEMIA CURVATA 10
 1ACHIN ACHNANTHES MINUTISSIMA 100
 1NIDIS NITZSCHIA DISSIPATA 5
 1NIFRU NITZSCHIA FRUSTULUM 8
 1GQANC GOMPHONEPA ANGSTATUM 40
 1CYM-S CYMBELLA MINUTA VAR. STILESII 8
 1GQOLI GOMPHONEPA OLIVACEUM 10
 1NAGOT NAVICULA NOTHA 1
 1SYULN SYNEDEA LLNA 1
 1ACLAD ACHNANTHES LANCEOLATA VAR. DUBIA 7
 1NAGOT NAVICULA GUTTLANDICA 1
 1CYCME CYCLOTHLLIA MENECHMINIANA 1
 1FPAVA FRAGILARIA VAUGHNII 2
 1NIPAL NITZSCHIA PALEA 1
 1RHCUR NAVICULA CRYPTOCEPHALA VAR. VENETA 4
 1F4ACA FRAGILARIA CAPUCINA 1

NAVICULA LANCEOLATA
NAVICULA VIRIDULA VAR. AVENACEA

REPLICATE - B
SAMPLE CATE - 093091

LOG NUMBER - 144-177 ANALYST - RD

TAXON CODE	TAXON	DIATOMS	NON-DIATOMS
		PROPORTIONAL COUNT	SEDGWICK-RAPHER COUNT
1	1		
2	2		
3	3		
4	4		
5	5		
6	6		
7	7		
8	8		
9	9		
10	10		
11	11		
12	12		
13	13		
14	14		
15	15		
16	16		
17	17		
18	18		
19	19		
20	20		
21	21		
22	22		
23	23		
24	24		
25	25		
26	26		
27	27		
28	28		
29	29		
30	30		
31	31		
32	32		
33	33		
34	34		
35	35		
36	36		
37	37		
38	38		
39	39		
40	40		
41	41		
42	42		
43	43		
44	44		
45	45		
46	46		
47	47		
48	48		
49	49		
50	50		
51	51		
52	52		
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54	54		
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56	56		
57	57		
58	58		
59	59		
60	60		
61	61		
62	62		
63	63		
64	64		
65	65		
66	66		
67	67		
68	68		
69	69		
70	70		
71	71		
72	72		
73	73		
74	74		
75	75		
76	76		
77	77		
78	78		
79	79		
80	80		
81	81		
82	82		
83	83		
84	84		
85	85		
86	86		
87	87		
88	88		
89	89		
90	90		
91	91		
92	92		
93	93		
94	94		
95	95		
96	96		
97	97		
98	98		
99	99		
100	100		

PALMELLA STAGE OF CHAETOPHORACEAE

2BALCH	PALMELLA STAGE OF CHAETOPHORACEAE	71
4USSPP	OSCILLATORIA Sp.	P
4AN4SP	ANACENA Sp.	3

133
RICCSPHENIA CURVATA

CCCCCIIIS PLACENTULA 27

ZUCASB
ACUNATHCS MINUTISSIMA
CLAUPTHOLA sp.

INIFRU	100
NITZSCHIA FRUSTULUM	6

INIPAL NITZSCHIA PALFA I

INICIS	NYVTSCHIA DISSIPATA	
1	1	
1	1	

LOCUS CYPRINELLA INGUSTRATOR
CYPRINELLA MINUTA VAR. SILESIACA

SYULN SYFCALNA DN77 VMCJAS

FRAGR	FRAGILARIA CROTONENSIS	10
FRAGILARIA CROTONENSIS		10

INTRO
HUTZSCHEA PULSATICA
CYPRILLA SINIATA

ACHANTHS LANCECLATA VAR. DURIA

NAVIA
NAVICULA VIPIDULA VAP. AVENACEA
2

TULLE	DIEHMA LENS VAP. FLJNGATU	1
INAGRA	NAV'CUA CRYPTOCERHAI VAP. MENETA	2

LEGGLI
GOMPHACEA GLIVACEU

160856 *Gomphonema suarclavatum* 1

CYMBELLA AFFINIS
NITZSCHIA LINEATA

FRAGILEJA VAUCHERIAE

LAMPER AMPHIZA FERPISILLA

INACHY NEVICULA RHYNCHOCERPHALA P

1PLSPP PLEUROSIGMA SP. P
 1NMIN NAVICULA MINIMA P
 1NALAN NAVICULA LANCEOLATA P
 1SYULO SYNDRA ULNA VAR. OXYRHYNCHUS P
 1SYFAS SYNDRA FASCICULATA P
 4P-SPP PHOPMIDILUM SP. 1

STATION 2 - MIDDLE STATION
 NUMBER OF REPLICATES - 3

REPLICATE - C
 SAMPLE DATE - 093081

C - 822 V - 125 ML DF - 1149 L - 50 MM W - 1 MM D - 1 MM S - 2 A - 3750 MM2
 SUBSTRATE - GLASS SLIDE

LOG NUMBER - 144-176 ANALYST - RD

NUMBER COUNTED

TAXON CODE TAXON DIATOMS PROPORTIONAL COUNT SEDGWICK-Rafter COUNT NON-DIATOMS

2PALCH	PALM-FILA STAGE OF CHAETOPHORACEAE		69	
2CLASP	CLADOPHORA SP.		P	
4OSSPP	OSCELLATORIA SP.		8	
1ACMIN	ACHNANTHES MINUTISSIMA	102		
1COCPL	COCONEPIS PLACENTULA	14		
1CYCME	CYCLotella MENEGHINIANA	10		
1NAVIA	NAVICULA VIRIDULA VAR. AVERNACEA	3		
1NACRV	NAVICULA CRYPTOCEPHALA VAR. VENETA	4		
1CYPSI	CYPAELLA SINDATA	1		
1GTSPE	GYGSSIGMA SPENCERII	1		
1SYULN	SYNDRA ULNA	1		
1ACIAD	ACHNANTHES LANCEOLATA VAR. DUBIA	13		
1CYMS	CYPAELLA MINUTA VAR. SILESIACA	2		
1GJANG	GYGSSIGMA ANGUSTATUM	19		
1NIFRU	NITZSCHIA FRUSTULUM	16		
1KACUR	KRITICOSPHEMIA CURVATA	6		
1NIDIS	NITZSCHIA DISSIPATA	4		
1EPRAV	FRAGILARIA VAUCHERIAE	1		
1CYMMI	CYPAELLA MINUTA	1		
1NIGOP	NITZSCHIA COMMUNIS	1		
1GGOLI	GYGSSIGMA OLIVACEUM	6		
1FRAGR	FRAGILARIA CROTCHENSI	4		
1MANAP	MANITZSCHIA AMPHIOXYIS	1		
1NABHY	NAVICULA KYNCHOCEPHALA	P		
1LOITEE	DIATOME TENLE VAR. ELONGATUM	P		
1NITHUM	NITZSCHIA HUNGARICA	P		
1NAEET	NAVICULA EXIGUA	P		
1SYULO	SYNDRA ULNA VAR. OXYRHYNCHUS	P		
4ANASPP	ANATAFNA SP.	1		
4P-SPP	PHOPMIDILUM SP.	4		
2SITEE	STIGELOCUNUM TERRE	12		

STATION 3 - HUNTER STATION
NUMBER OF REPLICATES - 3

REPLICATE - A
SAMPLE DATE - 093061

C - 921 V - 100 ML DF - 1149 L - 50 MM W - 1 MM D - 1 MM S - 2 A - 3750 MM2

SUBSTRATE - GLASS SLIDE

LOG NUMBER - 144-179

ANALYST - RD

NUMBER COUNTED

TAXON CODE TAXON DIATOMS PROPORTIONAL COUNT SEDGWICK-RAFTER COUNT NON-DIATOMS

2PALCH	PALMELLA STAGE OF CHAETOPHORACEAE			P
2STITE	STIGMODONTIUM TENUE			156
2CLASP	CLADOPHORA SP.			P
1NACIN	NAVICULA CINCTA	6		
1ACNIN	ACHNANTHES MINUTISSIMA	100		
1NIFRU	NITTSCHIA FRUSTULUM	29		
1NIDIS	NITTSCHIA DISSIPATA	13		
1GOENG	GOMPHONEMA ANGSTUTUM	35		
1ACUL40	ACHNANTHES LANCEOLATA VAR. DORIA	6		
1GOSUR	GOMPHONEMA SURCLAVATUM	1		
1NACRV	NAVICULA CRYPTOCEPHALA VAR. VENETA	3		
1CYPSI	CYPRILLA SINUATA	1		
1RH4CJ*	RHODOSPHERIA CURVATA	1		
1CYOME	CYCLOTILLA MENECHINIANA	3		
1COCPL	COCONEIS PLACENTULA	2		
1CYNYS	CYPRILLA MINUTA VAR. SILESIAEA	28		
1ACLAN	ACHNANTHES LANCEOLATA	1		
1FRACK	FRAGILARIA CROTONENSIS	1		
1GOLLI	GOMPHONEMA OLIIVACEUM	3		
1NAVIR	NAVICULA VIRIDULA	1		
1AMPFR	AMPHORPA PERPUSILLA	P		
1NIXOP	NITTSCHIA ROMANA	P		
1SYFAS	SYRFOGA FASCICULATA	P		
1SYULN	SYNEOPA ULNA	P		
1SYULD	SYNEOPA ULNA VAR. OXYRHYNCHUS	P		
1FRAVA	FRAGILARIA VAUCHERIAE	P		
1NIPAL	NITTSCHIA PALEA	P		
1DIPUL	DIPLOMA VULGARIS	5		
1NANDT	NAVICULA NOTHA	P		

STATION 3 - HUNTER STATION
NUMBER OF REPLICATES - 3

REPLICATE - P

TAXON CODE TAXON DIATOMS SEDGWICK-KAFTER COUNT NON-DIATOMS

TAXON CODE	TAXON	DIATOMS	SEDGWICK-KAFTER COUNT	NON-DIATOMS
INTRY	NITZSCHIA TRYBLIONELLA	1		
IAC-IN	ACHNANTHES MINUTISSIMA	100		
ICYMS	CYRELLA MINUTA VAR. STILSIACA	32		
INIDIS	NITZSCHIA OTSSTPATA	33		
INIFRU	NITZSCHIA FRUSTILLUM	27		
INALAN	NAVICULA LANCEOLATA	1		
ICOCPL	GOMPHONEPS PLACENTULA	18		
INABEL	NAVICULA HEUFLERI	7		
INIPAL	NITZSCHIA PALEA	6		
INACIN	NAVICULA CINCTA	1		
INACRV	NAVICULA CRYPTOCEPHALA VAR. VENETA	20		
IGDANG	GOMPHONEPS ANGUSTATUM	26		
INAVIA	NAVICULA VIRIDULA VAR. AVENACEA	1		
IRHCUP	RHOICOSPHERIA CURVATA	16		
ICYCHE	CYCLOTHELLA MENECHINIANA	15		
INAPIN	NAVICULA MINIMA	3		
INAPRO	NAVICULA PROTRACTA	1		
INILIN	NITZSCHIA LINEARIS	1		
IPLOEL	PLEUROSIGMA DELICATISSIMA	1		
IACIAD	ACHNANTHES LANCEOLATA VAR. DURIA	4		
INANDT	NAVICULA NOTHA	2		
ISUOVA	SIRELLA OVATA	1		
ITMSFP	TRALASSIOSIRA FLUVIATILIS	7		
INIHUN	NITZSCHIA HUNGARICA	1		
IFRAVA	FRAGILARIA VAUCHELETAE	2		
IGOOLI	GOMPHONEPS OLIVACEUM	4		
ICYMSP	CYRELLA SP.	P		
IAMPER	APPENDIXA PERPUSILLA	P		
IFRACR	FRAGILARIA CROTONESENSIS	P		
40SSPP	OSCILLATORIA SP.			
2STITE	STREPTOCOLONIUM TENUE			

14
22

CATHEDRAL BLUFFS SHALE OIL COMPANY
PICEANCE CREEK

STATION 1 - STEWART STATION
NUMBER OF REPLICATES - 3

REPLICATE - A
SAMPLE DATE - 102981

C - 47 V - 100 ML DF - 1:100 L - 50 MM W - 1 MM D - 1 MM S - 2 A - 3750 MM2
SUBSTRATE - GLASS SLIDE

LGG NUMBER - 144-193

NUMBER COUNTED

TAXON CODE	TAXON	PROPORTIONAL COUNT	SEDGWICK-RAFTER COUNT	DIATOMS
20RAPA	DRAPARNALOTIA SP.			
1N1LAT	NITZSCHIA LATENS	41		P
1SULIN	SURIARELLA LINEARIS	P		
1RHOUR	RHOICOSPHEMIA CURVATA	44		
1SYACL	SYMPHRA ACUS	26		
1CGOPL	COCODAEIS PLACENTULA	16		
1NAVIA	NAVICULA VIRIDULA VAR. AVENACEA	102		P
2MICSP	MICROSPORA SP.			
1CYELL	CYMATOCEPURA ELLIPTICA	P		
1NJOIS	NITZSCHIA DISSIPATA	97		
1NACRA	NAVICULA CRATICEOPHALA VAR. VENETA	36		
1CYMPS	CYRELLA MINUTA VAR. SILESIACA	20		
1CYCHE	CYCLOTHELLA MENECHINIANA	14		
1NASEA	NAVICULA SECRETA VAR. APICULATA	19		
1SYULD	SYMPHRA ULNA VAR. OXYRHYNCHUS	9		
1GDOLI	GOMPHONEMA OLIVACEUM	14		
1GJANG	GOMPHONEMA ANGUSTATUM	40		
1NIFLU	NITZSCHIA FRUSTILLUM	45		
1SYFAS	SYMPHRA FASCICULATA	10		
1GOSUS	GOMPHONEMA SURCLAVATUM VAR. UPSALIENSIS	26		
1JACHIN	ACHAETATHES MINUTISSIMA	13		
1NIGN	NITZSCHIA INNGRATA	1		
1NACRA	NAVICULA GRACILOIDES	1		
1NIPAL	NITZSCHIA PALEA	44		
1FRAVA	FRAGILLARIA VAUCHERIAE	8		
1GOCPE	GOCONEIS PEDICULUS	2		
1NIMUN	NITZSCHIA HUNGARICA	9		
1GIVUL	GIATYPA VULGARIS	2		
1NILIN	NITZSCHIA LINEARIS	3		
1NISPP	NITZSCHIA SP.	16		
1NIMOL	NITZSCHIA MOLSATICA	15		
1NITRL	NITZSCHIA TRYALIONELLA VAR. LEVIDENSIS	1		
1NAHEU	NAVICULA HELIOPHY	2		
1NALAN	NAVICULA LANCEOLATA	1		
1NACIN	NAVICULA CINCTA	1		
1NANOT	NAVICULA NOTHA	7		
1NACAF	ACHAETATHES AFFINIS	1		
1LUIFF	GIATYPA TENUE VAR. ELONGATUM	1		

1FKACA	FRAGILARIA CAPUCINA	1
1N1ACI	NITZSCHIA ACICULARIS	2
1NAACU	NAVICULA AUCICULATA	1
1PLDEL	PLEUROSIGMA DELICATISSIMA	1
1FRACV	FRAGILARIA CONSTANS VAR. VENETA	1
1NAKHY	NAVICULA RHYNCHOCEPHALA	6
1NAELG	NAVICULA ELGINENSIS	1
1AMQVP	AMPHOCOA OVALIS	4
1SUOVA	SULFIRELLA OVATA	1
1RPGIB	RHOPALOOIA GI9BERULA	P
1ACIAD	ACHPANTHUS LANCEOLATA VAR. DUBIA	P
1GYSPE	GYROSIGMA SPENCERII	P

STATION 1 - STEWART STATION
NUMBER OF REPLICATES - 3

REPLICATE - B
SAMPLE DATE - 102981

C - 530 V - 100 ML DF - 11100 L - 50 MM W - 1 MM D - 1 MM S - 2 A - 3750 MM2
SUBSTRATE - GLASS SLIDE

LOG NUMBER - 144-192 ANALYST - RD

NUMBER COUNTED

TAXON CODE TAXON DIATOMS PROPORTIONAL COUNT SEDGWICK-AFTER COUNT

2DRAPA	DRAPARHALOIA SP.		8
1N1HUN	NITZSCHIA HUNGARICA	2	
1NAVIA	NAVICULA VITIDULA VAR. AVENACEA	100	
1RHCUR	RHOICOSPHEMIA CURVATA	44	
1GYSPE	GYROSIGMA SPENCERII	P	
1SUQVL	SULFIRELLA OVALIS	P	
4USPSP	USCILLATORIA SP.	2	
1N1ACI	NITZSCHIA ACICULARIS	P	
1SYACU	SYNEOPA ACUS	22	
1UIVUL	DIATOMA VULCAPE	12	
1GGOLI	GOMPHONEPA OLIVACEUM	24	
1GOSUS	GOMPHONEPA SURCLAVATUM VAR. UPSALIENSIS	33	
1GUANG	GOMPHONEPA ANGUSTATUM	64	
1GOCPE	GOMPHONEPA PEDICULUS	6	
1GOCPL	GOMPHONEPA PLACENTULA	28	
1N1DIS	NITZSCHIA DISSIPATA	102	
1N1PAL	NITZSCHIA PALEA	50	
1N1PAL	NITZSCHIA PALEA	2	
1N1IGN	NITZSCHIA IGNORATA	66	
1N1FRL	NITZSCHIA FRUSTULUM	29	
1CYCHE	CYCLotella MENECHINIANA	5	
1FRAVA	FRAGILARIA VAUCHEPIAE	43	
1ACMIN	ACHPANTHUS MINUTISSIMA	6	
1THSPR	THALASSIOSIRA FLUVIATILIS	6	
1SYOLD	SYNEOPA ULNA VAR. OXYPHYNCHUS	36	
1N1ACPV	NAVICULA CRYPTOCEPHALA VAR. VENETA	6	
1N1ASEA	NAVICULA SECPETA VAR. APICULATA	6	

ISYPAR	SYMPEDRA PARASITICA	6
INILIN	NIITZSCHIA LINEAEIS	2
INACKY	NAVICULA CRYPTOCOPHALA	3
INAFED	NAVICULA HEUFELERI	1
INANUT	NAVICULA NOTHA	3
INAPHY	NAVICULA RHYNCHOCEPHALA	10
IOITFE	DIATOMA TERUE VAR. ELONGATUM	4
INIMOL	NIITZSCHIA HOLSATICA	16
IACLAC	ACHNANTHES LANCEOLATA VAR. DUBIA	19
IACLIN	ACHNANTHES LINEARIS	1
INACIN	NAVICULA CINCTA	3
ICYMMS	CYPRILLA MINUTA VAR. SILESIACA	13
IGOTRU	GOMPHONEMA TRUNCATUM	2
INILAT	NIITZSCHIA LATENS	26
ISYFAS	SYMPEDRA FASCICULATA	7
ISYULN	SYMPEDRA ULNA	2
IAMPER	AMPHIPRA PERPUSILLA	3
IFRAGR	FRAGILARIA GROTTONENSIS	2
INICOM	NIITZSCHIA COMMUNIS	5
IFRACV	FRAGILARIA CONSTRUENS VAR. VENETA	1
INIACI	NIITZSCHIA ACICULARIS	3
ISYKIN	SYMPEDRA PINUSCULA	1

STATION 1 - STEWART STATION
NUMBER OF REPLICATES - 3

REPLICATE - C
SAMPLE DATE - 1029R1

C - 499 V - 100 ML DE - 1:100 L - 50 MM W - 1 MM D - 1 MM S - 2 A - 3750 NM2
SUBSTRATE - GLASS SLIDE

LOG NUMBER - 144-193 ANALYST - RD

NUMBER COUNTED

TAXON CODE	TAXON	DIATOMS PROPORTIONAL COUNT	NON-DIATOMS SEDGWICK-HAFTER COUNT
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IDIVUL	DIATOMA VULGARF	7	
ISYACU	SYMPEDRA ACUS	4	
ZORAPA	DRAPARNALDIA SP.		R
ZULZON	ULOTHRIX ZONATA		P
INILAT	NIITZSCHIA LATENS	33	
INAVIA	NAVICULA VIRIDULA VAR. AVENACEA	100	
IGOSUS	GOMPHONEMA SUBCLAVATUM VAR. UPSALIENSIS	18	
IGOACU	GOMPHONEMA ACUMINATUM	2	
ICOCPL	COCCONEIS PLACENTULA	16	
INIFRU	NIITZSCHIA FRUSTULUM	66	
INHCUP	PHUCOSIPHONIA CURVATA	68	
ICYMMS	CYPRILLA MINUTA VAR. SILESIACA	26	
INIDIS	NIITZSCHIA DISSIPATA	47	
INIPAL	NIITZSCHIA PALFA	60	
ICYCHE	CYCLOTILLA MEFCHINTIANA	29	
IGDJANG	GOMPHONEMA ANGUSTATUM	49	

IGOCLE	GOMPHONEMA OLIVACEUM	15
INHOL	NITZSCHIA HOLSATICA	46
INARH	NAVICULA RHYNCHOCEPHALA	13
INACRV	NAVICULA CRYPTOCEPHALA VAR. VENETA	23
INASEA	NAVICULA SECETA VAR. APICULATA	36
INAEU	NAVICULA HEUFLEPI	16
INANT	NAVICULA NUTHA	12
IFRAVA	FRAGILARIA VAUCHERIAE	11
INAHAL	NAVICULA HALOPHILA	1
ICOCPE	COCconeis PEDICULUS	3
IACMIN	ACHNANTHES MINUTISSIMA	4
IACGLAD	ACHNANTHES LANCEOLATA VAR. DUBIA	18
IRHGIR	RHOPALODIA GIRARDULA	2
ISYULO	SYNDORA ULNA VAR. OXYRHYNCHUS	12
ISYMIN	SYNDORA PINUSCULA	1
IFRACR	FRAGILARIA PROTOMENENSIS	2
INACKY	NAVICULA CRYPTOCEPHALA	1
INIHUN	NITZSCHIA HUNGARICA	2
INALAN	NAVICULA LANCEOLATA	2
ICMYTL	CYPRILLA TUATIDA	2
INIGN	NITZSCHIA IGNORATA	1
IAMOVV	AMPHOTPA GVALIS	3
INILIN	NITZSCHIA LINEARIS	3
ICYELL	CYATHOPLEURA ELLIPTICA	1
ISYPUL	SYNDORA FULCHELLA VAR. LANCEOLATA	2
ITHSPR	THALASSIOSIRA FLUVIATILIS	3
IYIACI	NITZSCHIA ACTICULARIS	1
IAMPFR	APPHORA FERPUSTILLA	2
INAMEU	NAVICULA MENTISCOLUS VAR. UPSALIENSIS	2
INISPP	NITZSCHIA SP.	7
INAPUP	NAVICULA PUPULA	1

STATION 2 - MIDDLE STATION
NUMBER OF REPLICATES - 3

REPLICATE - A
SAMPLE DATE - 102981

C - 455 V - 100 ML OF - 1:100 L - 50 MM W - 1 MM D - 1 MM S - 2 A - 3750 MM2
SUBSTRATE - GLASS SLIDE

LOG NUMBER - 144-194 ANALYST - RD

NUMBER COUNTED

TAXON CODE	TAXON	DIATOMS	NON-DIATOMS	PROPORTIONAL COUNT	SEDGWICK-AFTER COUNT
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3HYOSP	HYDROSPUS SP.				9
1CAAMP	CALONIS AMPHISRAENA		P		
1PLDEL	PLEUROSIGMA DELICATISSIMA		P		
1IRILAT	NITZSCHIA LATENS		28		
1NAVIA	NAVICULA VIRIDULA VAR. AVENACEA		101		
1GYSPE	GYROSIGMA SPENCERI		P		
1COCPL	COCconeis PLACENTULA		15		

184CUP	RHOICOSPHEMIA CURVATA	35
184HUN	NITZSCHIA HUNGARICA	1
184PMS	CYPRILLA MINUTA VAR. SILESIACA	21
184VELL	CYMATOPLEURA ELLIPTICA	P
20ESPP	OELDGMONIUM SP.	P
18NPAL	ENTOMONEIS PALUDOSA	P
2STITE	STIGMODICLONIUM TENUE	P
184GVP	APPACHA CVALIS	4
2MICSP	MICROSPORA SP.	P
184DLI	GORPHONEMA OLIVACEUM	22
184CRV	NAVICULA CRYPTOCOPHALA VAR. VENETA	50
184SEA	NAVICULA SECRETA VAR. APICULATA	65
184OVA	SLIPRELLA OVATA	12
184JANG	GORPHONEMA ANGUSTATUM	25
184GUS	GORPHONEMA SURCLAVATUM VAR. UPSALIENSIS	13
184MIN	ACHNANTHES MINUTISSIMA	32
184ILIM	NITZSCHIA LINEARIS	6
184HEU	NAVICULA HEUFELERI	6
184FRU	NITZSCHIA FRUSTULUM	24
184CME	CYCLITELLA MENEGHINIANA	18
184RAE	FRAGILARIA LEPTOSTAURON	3
184VUL	DIATOMA VULGARE	8
184NAL	NAVICULA LANCEOLATA	1
184KAC	FRAGILARIA CRYPTONENSIS	12
184CLAD	ACHNANTHES LANCEOLATA VAR. DUBIA	22
184ICIS	NITZSCHIA DISSIPATA	8
184INT	GORPHONEMA INTRICATUM	1
184OPE	COCconeis PEDICULUS	1
184FAS	SYNDRA FASCICULATA	6
184IACI	NITZSCHIA ACICULARIS	1
184PHY	NAVICULA RHYNCHOCEPHALA	8
184YACU	SYNDRA ACUS	1
184KAVA	FRAGILARIA VAUCHERIAE	11
184PUL	SYNDRA PULCHRELLA VAR. LANCEOLATA	26
184PAL	NITZSCHIA PALEA	13
184THSP	THALASSIOSIRA FLUVIATILIS	2
184MGL	NITZSCHIA MOLSATICA	2
184ULO	SYNDRA ULNA VAR. OXYRHYNCHUS	4
184PUP	NAVICULA PUPULA	1
184MEU	NAVICULA MENISCULUS VAR. UPSALIENSIS	1
184KAV	FRAGILARIA CONSTRIENS VAR. VENETA	2
184SIM	GORPHONEMA SIMUS	3
184MIC	ACHNANTHES MICROCEPHALA	1
184NOT	NAVICULA NOTHA	4
184PTU	CYPRILLA TUMIDA	1
184ISPP	NITZSCHIA SP.	1
184ICOM	NITZSCHIA COMMUNIS	2
184GVP	APPACHA CVALIS	1
184ULN	SYNDRA ULNA	3
184PSI	CYPRILLA SINUATA	1

STATION 2 - MIDDLE STATION
NUMBER OF REPLICATES - 3

REPLICATE - P
SAMPLE DATE - 102981

C - 645 V - 100 4L DF - 11100 L - 50 MM V - 1 MM 0 - 1 MM S - 2 A - 3750 MM2
SUBSTRATE - GLASS SLIDE

NUMBER COUNTED

TAXON CODE	TAXON	DIATOMS		NON-DIATOMS	
		PROPORTIONAL COUNT	SEGWICK-KAFTER COUNT	PROPORTIONAL COUNT	SEGWICK-KAFTER COUNT
1CQCPL	COCONEIS PLACENTULA			32	
1N1LAT	NITZSCHIA LATENS			4	
1N1HUN	NITZSCHIA HUNGARICA			P	
1RHGUR	RHODOSPHEA CURVATA			16	
1NAVIA	NAVICULA VIRIDULA VAP. AVENACEA			77	
1AMGVP	AMPHORA OVALIS			P	
1SULIN	SUTRILLA LINEARIS			P	
1PLEDEL	PLEUROSICMA DELICATISSIMA			P	
1AMPEL	AMPHIPLEURA PELLUCIDA			1	
1SUOVL	SUTIRELLA OVALIS			1	
1SUJVA	SUTIRELLA OVATA			4	
2CLAGL	CLAOPHOREA GLOMERATA			3	
1CYELL	CYMATOPLEURA ELLIPTICA			P	
1MELVA	MELISSA VARIANS			P	
1NACRY	NAVICULA CRYPTOCEPHALA			13	
1NACRV	NAVICULA CRYPTOCEPHALA VAR. VENETA			100	
1INDIS	NITZSCHIA DISSIPATA			12	
1GDANG	GOMPHONEMA ANGUSTATUM			21	
1FRALE	FRAGILARIA LEPTOSTAURON			5	
1ACMIN	ACHNANTHES MINUTISSIMA			33	
1NIFRU	NITZSCHIA FRUSTULUM			9	
1N1PAL	NITZSCHIA PALEA			7	
1N1AFHY	NAVICULA RHYNCHOCEPHALA			15	
1CYCME	CYCLOTELLA MENEGHINIANA			21	
1ACAFF	ACHNANTHES AFFINIS			1	
1NALAN	NAVICULA LANCEOLATA			2	
1GOSUB	GOMPHONEMA SURCLAVATUM			4	
1NASEA	NAVICULA SECRETA VAR. APICULATA			1	
1CYMSI	CYPRILLA SINUATA			2	
1NAHEU	NAVICULA HEURLERI			15	
1ACLAD	ACHNANTHES LANCEOLATA VAP. DUBIA			8	
1CYMWS	CYPRILLA MINUTA VAR. SIFFSIACA			8	
1FRACR	FRAGILARIA CROTONENSIS			5	
1NANOT	NAVICULA NOTHA			11	
1SYFAS	SYMPHORA FASCICULATA			5	
1NAELG	NAVICULA ELGINENSIS			1	
1NAPUU	NAVICULA MUTICA VAR. UNDULATA			1	
1SYPAR	SYMPHORA PARASTITICA			1	
1AMPER	AMPHORA FERUSILLA			1	
1SYACU	SYMPHORA ACUS			2	
1GCOLI	GOMPHONEMA OLIVACEUM			5	
1DITEP	DIATOMA TENUE VAR. ELONGATUM			1	
1FRAVA	FRAGILARIA VAUCHERIIAE			4	
1HANAM	HANTZSCHIA AMPHIOXYS			1	
1SYULN	SYMPHORA ULNA			2	
1FRACV	FRAGILARIA CONSTRIENS VAR. VENETA			5	
1N1LIN	NITZSCHIA LINEARIS			2	
1NAPUP	NAVICULA PUPULA			1	
1D1VUL	DIATOMA VULGARF			1	
1N1IGN	NITZSCHIA IGNORATA			1	
1N1AMEU	NAVICULA MENISCILUS VAR. UPSALIENSIS			3	
1N1AMIN	NAVICULA MINIMA			1	

STATION 2 - MIDDLE STATION
NUMBER OF REPLICATES - 3

REPLICATE - C
SAMPLE DATE - 102981

C - 586 V - 100 ML DF - 1:100 L - 50 MM W - 1 MM D - 1 MM S - 2 A - 3750 MM2

SUBSTRATE - GLASS SLIDE
LOG NUMBER - 144-156 ANALYST - RD

NUMBER COUNTED	
TAXON CODE	TAXON
DIATOMS	
PROPORTIONAL COUNT	
NON-DIATOMS	
SEDGWICK-RAPHER COUNT	

INILAT	NITZSCHIA LATENS	41	
IGOSUS	GOMPHONEMA SURCLAVATUM VAP. UPSALIENSIS	7	
INAVIA	NAVICULA VIRIDULA VAP. AVENACEA	101	
INIHUN	NITZSCHIA HUNCARTICA	3	
IPLODEL	PLEUROSIGMA DELICATISSIMA	3	
ESTITE	STIGMODONUM TENUE		P
ISUOVA	SURFELLA OVATA	4	
ICAAAMP	CALONEIS AMPHISBAENA	P	
ICYCME	CYCLITELLA MENEGHINIANA	21	
IRHOUR	RHODOSPHECIA CURVATA	37	
INACAV	NAVICULA CRYPTOCERPHALA VAP. VENETA	75	
IGGULI	GOMPHONEMA OLIVACEUM	39	
ISYACL	SYNDORA ACUS	8	
ICYELL	CYATERPURA ELLIPTICA	2	
IFRAVA	FRAGILARIA VAUCHERIAE	6	
IFRACK	FRAGILARIA CROTCHENSIS	41	
IACLAO	ACHYANTHES LANCICLATA VAP. DUBIA	23	
ISYULO	SYNDORA ILNA VAP. OXYRHYNCHUS	5	
INESPP	NEOTUM SP.	1	
INILIN	NITZSCHIA LINEARIS	2	
INAHOU	NAVICULA HEUPELI	6	
ISUGVL	SLIPPELLA OVALIS	2	
ICOCPL	COCONEIS PLACENTULA	17	
INIFRU	NITZSCHIA FRUSTULUM	27	
IACMIR	ACHYANTHES MINUTISSIMA	40	
INIDIS	NITZSCHIA DISSIPATA	6	
ICYMP5	CYRSELLA MINUTA VAP. SILESIAE	5	
IMIPAL	NITZSCHIA PALEA	8	
INILAL	NITZSCHIA TOYALIONELLA VAP. LEVIDENSIS	3	
IGGANG	GOMPHONEMA ANGUSTATUM	21	
INALAN	NAVICULA LANCEOLATA	1	
INACIN	NAVICULA CINCTA	1	
IDITEE	DIATOMA TENUE VAP. ELONGATUM	3	
ICYMSI	CYRSELLA SINUATA	1	
ICYATU	CYRSELLA TUMIDA	1	
IAAPFA	ACHYANTHES PERPUSILLA	7	
INAFEL	NAVICULA FLORIFENSIS	1	
INAMFU	NAVICULA MENISCULUS VAP. UPSALIENSIS	4	

1NAMHY	NAVICULA PHYNCHOCEPHALA	4
1SYFAS	SYNEORA FASCICULATA	5
1SYPLU	SYNEORA PULCHELLA VAR. LANCEOLATA	7
1DIIVUL	DIATOMA VULGARE	2
1HANAM	HANTZSCHIA AMPHIOXYS	1
1NIHOL	NITZSCHIA HOLSATICA	7
1SYPAR	SYNEORA PARASITICA	1
1GYSPE	GYDSICHA SPENCEII	1
1NIATSC	NAVICULA TPIUNCTATA VAR. SCHIZONEMOIDES	4
1NAPPG	NAVICULA PROTRACTA	1
1NACRY	NAVICULA CRYPTOCEPHALA	1
1THSPP	THALASSIOSIRA FLUVIATILIS	1
1NAPUP	NAVICULA PUPULA	1
1ERALE	FRAGILARIA LEPTOSTAUPON	1
1COOPE	COCODNEIS PEDICULUS	1

STATION 3 - HUNTER STATION
NUMBER OF REPLICATES - 3

REPLICATE - A
SAMPLE DATE - 102981

C - 1062 V - 100 ML DF - 1100 L - 50 MM W - 1 MM D - 1 MM S - 2 A - 2750 MM2
SUBSTRATE - GLASS SLIDE

LOG NUMBER - 344-197 ANALYST - RD

NUMBER COUNTED

TAXON CODE TAXON DIATOMS PROPORTIONAL COUNT SEDGWICK-AFTER COUNT

1MELVA	MELDISIPA VARIANS	P	
1SUOVL	SUTIRELLA OVALIS	P	
1NILAT	NITZSCHIA LATENS	4	
1PLOEL	PLEUROSICHA PELICATISSIMA	P	
1CAAMP	CALENFIS AMPHISRAFA	P	
1RHGUR	RHODOSPHERIA CURVATA	5	
1NAVIA	NAVICULA VIRIDULA VAR. AVENACEA	22	
1DIIVUL	DIATOMA VULGARE	1	
1SUOVA	SUTIRELLA OVATA	14	
1GYSPE	GYDSICHA SPENCEII	2	
2PALCP	PALMELLA STAGE CF CHAETOPHORACEAE		2
1NIFRU	NITZSCHIA FRUSTULUM		
1COOPL	COCODNEIS PLACENTULA	104	
1NIDIS	NITZSCHIA DISSIPATA	30	
1ACMIN	ACHNANTHES MINUTISSIMA	11	
1NAMEU	NAVICULA MENISCULUS VAR. UPSALIENSIS	109	
1NACAP	NAVICULA CAPITATA	1	
1GDJANG	GYDSICHA ANGUSTATUM	3	
1ACCLAD	ACHNANTHES LANCEOLATA VAR. DUBIA	50	
1NACRV	NAVICULA CRYPTOCEPHALA VAR. VENETA	24	
1NICOM	NITZSCHIA COMMUNIS	34	
1GOGLI	GYPSICHA GLIVACEUM	2	
1NIHUN	NITZSCHIA HUNGARICA	25	
		14	

1FRAVA	FRAGILARIA VAUCHERIAE	
1NASEA	NAVICULA SECRETA VAR. APICULATA	1
1NAMEL	NAVICULA MFULEPI	9
1THSPP	THALASSIOSIRA FLOVIATILIS	6
1NIPAL	NITZSCHIA PALEA	15
1CYCME	CYCLOTHELLA MENEGHINIANA	4
1SYFAS	SYNEDEA FASCICULATA	2
1SYACU	SYNEDEA ACUS	2
1NITRL	NITZSCHIA TRYBLIONELLA VAR. LEVIDENSIS	2
1NIDEN	NITZSCHIA DENTICULA	2
1PMUS	PLEUROTHERIA MUSCULUS	1
1NANOT	NAVICULA NOTHA	2
1ACAFF	ACHANATHES AFFINIS	1
1SYULN	SYNEDEA ULNA	3
1NIHOL	NITZSCHIA HOLSATICA	10
1MATSC	NAVICULA TRIPUNCTATA VAR. SCHIZONEMOIDES	30
1GOSUS	GYRONEURA SUBCLAVATUM VAR. UPSALIENSIS	2
1NACIN	NAVICULA CINCTA	1
1NIACI	NITZSCHIA ACICULARIS	5

STATION 3 - HUNTER STATION
NUMBER OF REPLICATES - 3

REPLICATE - F
SAMPLE DATE - 102981

C - 559 V - 100 ML DE - 1:150 L - 50 MM W - 1 MM D - 1 MM S - 2 A - 3750 MM2
SUBSTRATE - GLASS SLIDE

LOG NUMBER - 144-19P ANALYST - RD

TAXON CODE	TAXON	DIATOMS		NON-DIATOMS	
		PROPORTIONAL COUNT	SEDGWICK-RAFTER COUNT		
2MICSP	MICROSPORA SP.			P	
2TETSP	TETRASPORA SP.			P	
1ACIAD	ACHANATHES LANCEOLATA VAR. DORIA	12			
1ACMIN	ACHANATHES MINUTISSIMA	67			
1NIFRU	NITZSCHIA FRUSTULUM	110			
1NAVIA	NAVICULA VIRIDULA VAR. AVENACEA	4			
1NACIN	NAVICULA CINCTA	1			
1NIPAL	NITZSCHIA PALEA	35			
1NAPEL	NAVICULA PELLICULOSA	1			
1GOSUR	GYRONEURA SUBCLAVATUM	3			
1NACRY	NAVICULA CRYPTOCOPHALA VAR. VENETA	53			
1GUANG	GYRONEURA ANGUSTATUM	34			
1GOLUL	GYRONEURA OLIVACEUM	30			
1SUOVA	SUPROPELLA OVATA	31			
1NIDIS	NITZSCHIA DISSIPATA	23			
1NIDUM	NITZSCHIA COMMUNIS	2			
1NANOT	NAVICULA NOTHA	10			
1NITAT	NITZSCHIA LATENS	1			
1GOSPL	GYRONEURA PLACENTULA	9			

INIHUN	NITZSCHIA HUNGARICA	23
INILIN	NITZSCHIA LINFAHIS	3
INISPP	NITZSCHIA SP.	9
ICYCHE	CYCLOTILLA MENECHINIANA	12
INAPEL	NAVICULA PELLICULOSA	1
INAMIN	NAVICULA MINIMA	3
INACLG	NAVICULA ELGINENSIS	3
INAMEU	NAVICULA HEUFLERI	20
ISYFAS	SYNERA FASCICULATA	1
INATSC	NAVICULA TRIPUNCTATA VAR. SCHIZONEMOIDES	6
INAMIS	NAVICULA MINUSCULA	4
INIHOL	NITZSCHIA HOLSATICA	13
ISYACU	SYNERA ACUS	1
ITHSPP	THALASSIOSIRA FLUVIATILIS	2
IHANAM	HANTZSCHIA AMPHYOXY	P
IFRAVA	FRATILARIA VAUCHERIAE	P
IAMVEN	AMPHIPA VENETA	P
INIDEN	NITZSCHIA DENTICULA	P
ICOCPE	CCCCHEIS PEDICULUS	P
IGYSPE	GYFOSIGMA SPENCERII	P

STATION 3 - MONT STATION
NUMBER OF REPLICATES - 3

REPLICATE - C
SAMPLE DATE - 102001

C - 684 V - 100 ML DF - 1:200 L - 50 MM V - 1 MM 0 - 1 MM S - 2 A - 3750 MM2
SUBSTRATE - CLASS SLIDE

LOG NUMBER - 144-195 ANALYST - RD

NUMBER COUNTED

TAXON CODE	TAXON	DIATOMS PROPORTIONAL COUNT	NON-DIATOMS SEDGWICK-RAFTER COUNT
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2PALCH	PALMELLA STAGE OF CHAETOPHORACEAE		10
2MICSP	MICROSPORA SP.		1
2TETSP	TETRASPOA SP.		P
2STITE	STIGEOCLONIUM TENUE		P
INIPAL	NITZSCHIA PALFA	21	
INIERU	NITZSCHIA FRUSTULUM	9	
IACHIN	ACHNANTHES MINUTISSIMA	100	
IACLAO	ACHNANTHES LANCEOLATA VAR. DUBIA	36	
ISUDVA	SUPIRELLA OVATA	8	
INACCV	NAVICULA CRYPTOCEPHALA VAR. VENETA	12	
IGORAG	GOMPHRETTA ANGUSTATUM	31	
IGOOLI	GOMPHRETTA OLIVACEUM	43	
ICOCPL	CCCCHEIS PLACENTULA	37	
INAVIA	NAVICULA VIRIDULA VAR. AVENACEA	8	
ICYCHE	CYCLOTILLA MENECHINIANA	4	
ITHSPP	THALASSIOSIRA FLUVIATILIS	1	
INACIN	NAVICULA CINCTA	2	
ISYULN	SYNERA ULNA	2	

IRHCUR	RHOICOSPHEMIA CURVATA	2
ISVEAS	SYMPHORA FASCICULATA	1
IGOSUB	ECYPHONEMA SUPCLAVATUM	2
INIFUN	NIITSCHIA HUNGARICA	10
IACMIC	ACHNANTHES MICROCEPHALA	3
INAAKV	NAVICULA ARVENSI	2
INAEU	NAVICULA HEUFLEI	23
INILIN	NIITSCHIA LINEAFIS	P
INIDIS	NIITSCHIA DISSIPATA	P
ISVACL	SYMPHORA ACUS	P
ISUOVL	SURIRELLA OVALIS	P
IERALE	FRAGILARIA LEPTOSTAURON	P
INATSC	NAVICULA TRIPUNCTATA VAR. SCHIZONEPHOIDES	P

Table 2.5.2-6

PERIPHYTON BIOASSAY PENCIL SHEET

CATHEDRAL PLUFFS SHALE OIL COMPANY
PICEANCE CREEK

SAMPLE DATE - 052881

ANALYST - RD

AREA SCRAPED - 37.5 CM²

STATION-PEP	DRY WEIGHT (GM)	ASH WEIGHT (GM)
1A	.8125	.0938
1B	.9262	.1069
1C	.6987	.0907
2A	.0834	.0155
2B	.1015	.0144
2C	.0870	.0142
3A	.3008	.0360
3B	.4424	.0527
3C	.3717	.0444

PERIPHYTON BIOMASS BENCH SHEET

CATHEDRAL BLUFFS SHALE OIL COMPANY
PISCATAWAY, NEW JERSEY

SAMPLE DATE - 0630P1

ANALYST - PD

AREA SCRAPED - 37.5 CM2

STATION-REP	DRY WEIGHT (GM)	ASH WEIGHT (GM)
1A	.1677	.0138
1B	.6074	.0499
1C	.7308	.0598
2A	.5263	.0483
2B	.4264	.0351
2C	.4108	.0377
3A	.5001	.0462
3B	.6459	.0634
3C	.3717	.0344

PERIPHERY RICHARDSON PENCIL SHEET

CATHEDRAL BLUFFS SHALE OIL COMPANY
PICEANCE CREEK

SAMPLE DATE - 073061
ANALYST - RD
AREA SCAPED - 37.5 CM2

STATION-RFP	DRY WEIGHT (GM)	ASH WEIGHT (GM)
1A	.1580	.1165
1B	.1657	.1221
1C	.1735	.1278
2A	.3684	.0425
2B	.3869	.0449
2C	.2205	.0254
3A	.2490	.0271
3B	.3838	.0418
3C	.4047	.0442

PERIPHYTON BIOMASS RENCH SHEET

CATHEDRAL BLUFFS SHALE OIL COMPANY
PICEANCE CREEK

SAMPLE DATE - 083181

ANALYST - RO

AREA SCRAPPED - 37.5 CM2

STATION-REP	DWY WEIGHT (GM)	ASH WEIGHT (GM)
1A	.2850	.0250
1B	.2504	.0219
1C	.2112	.0185
2A	.3446	.0420
2B	.3493	.0411
2C	.3412	.0420
3A	.5710	.0659
3B	.4735	.0546
3C	.3701	.0426

PERIPHYTON BIOMASS PENCIL SHEET

CATHEDRAL BLUFFS SHALE OIL COMPANY
PICEANCE CREEK

SAMPLE DATE - 093081

ANALYST - RD

AREA SCRAPED - 37.5 CM2

STATION-REP	DRY WEIGHT (GM)	ASH WEIGHT (GM)
1A	.0775	.0185
1B	.0590	.0135
1C	.0791	.0189
2A	.2959	.0566
2B	.2018	.0385
2C	.2449	.0476
3A	.2689	.0450
3B	.2387	.0399
3C	.1706	.0284

PERIPLHYTON BIOMASS BENCH SHEET

CATHEDRAL BLUFFS SHALE OIL COMPANY
PICCANANCE CREEK

SAMPLE DATE - 102961
ANALYST - RO
AREA SCRAPED - 37.5 CM2

STATION-REP	DRY WEIGHT (GM)	ASH WEIGHT (GM)
1A	.1686	.0242
1B	.1602	.0230
1C	.1770	.0253
2A	.4118	.0503
2B	.3959	.0446
2C	.4265	.0521
3A	.3023	.0378
3B	.4763	.0534
3C	.3554	.0508

Table 2.5.2-7

PERIPHYTON BIODASS ANALYSIS

CATHEDRAL ALLEES SHALE OIL COMPANY
PICEANCE CREEK

SAMPLE DATE - 0524HJ
APCA SCRAPED - 27.5 CM2

STATION-REP	DRY WEIGHT (GM)	ASH WEIGHT (GM)	BIODASS (MG/CM2)	STATION AVERAGE (MG/CM2)
1A	.0125	.0938	19.165	
1B	.0262	.1049	21.848	
1C	.0987	.0607	16.480	19.164
2A	.0834	.0155	1.811	
2B	.1015	.0168	2.235	
2C	.0870	.0142	1.888	1.968
3A	.3008	.0360	7.061	
3B	.424	.0527	13.392	
3C	.3717	.0444	8.726	8.727

PERIPHYTON BIOMASS ANALYSIS

CATHEDRAL PLUMES SHALE OIL COMPANY
PICEANCE CREEK

SAMPLE DATE - 0530P1
AREA SCRAPED - 37.5 CM2

STATION-REP	DRY WEIGHT (GM)	ASH WEIGHT (GM)	BIOMASS (MG/CM2)	STATION AVERAGE (MG/CM2)
1A	.1677	.0138	4.104	
1B	.6074	.6499	14.867	
1C	.7304	.0598	17.893	
2A	.5263	.0483	12.747	12.268
2B	.4264	.0391	10.324	
2C	.4108	.6377	9.949	11.008
3A	.5001	.0462	12.104	
3B	.6859	.0634	16.606	
3C	.3717	.6344	8.905	12.566

PERIPHYTON BIOMASS ANALYSIS

CATHEDRAL BLUFFS SHALE OIL COMPANY
PICCANANCE CREEK

SAMPLE DATE - 071081
AREA SCRAPED - 37.5 CM2

STATION-REP	DRY WEIGHT (GM)	ASH WEIGHT (GM)	BIOMASS (MG/CM2)	STATION AVERAGE (MG/CM2)
1A	.1580	.1165	1.107	
1B	.1457	.1221	1.162	
1C	.1735	.1278	1.219	1.163
2A	.3684	.0425	8.691	
2B	.3289	.0449	9.173	
2C	.2206	.0254	5.205	7.690
3A	.2490	.0271	5.917	
3B	.3828	.0418	9.126	
3C	.5047	.0442	9.613	8.217

PERIPHYTON BIOMASS ANALYSIS

CATHEDRAL BLUFFS SHALE OIL COMPANY
PICEANCE CREEK

SAMPLE DATE - 083181
AREA SCAFFED - 37.5 CM2

STATION-REP	DRY WEIGHT (GM)	ASH WEIGHT (GM)	BIOMASS (MG/CM2)	STATION AVERAGE (MG/CM2)
1A	.2850	.0250	6.933	
1B	.2504	.0219	5.593	
1C	.2112	.0185	5.139	6.055
2A	.3046	.0420	9.403	
2B	.3893	.0411	9.285	
2C	.3912	.0420	9.312	9.333
3A	.5710	.0659	13.493	
3B	.4735	.0546	11.171	
3C	.3701	.0426	6.735	11.132

PERIPLATON BIOMASS ANALYSIS

CATHEDRAL BLUES SHALE OIL COMPANY
PICEANCE CREEK

SAMPLE DATE - 0030R1
AREA SCAPED - 37.5 CM2

STATION-REP	DRY WEIGHT (GM)	ASH WEIGHT (GM)	BIOMASS (MG/CM2)	STATION AVERAGE (MG/CM2)
1A	.0775	.0185	1.573	
1B	.0560	.0135	1.213	
1C	.0741	.0199	1.605	
2A	.2059	.0566	6.341	1.464
2B	.2014	.0345	4.355	
2C	.2489	.0474	5.368	5.368
3A	.2689	.0450	5.971	
3B	.2387	.0399	5.301	
3C	.1706	.0284	3.752	5.021

PERIPHYTE BIOMASS ANALYSIS

CATHEDRAL BLUFFS SHALE OIL COMPANY
PICEANCE CREEK

SAMPLE DATE - 102981
AREA SCRAPED - 37.5 CM2

STATION-REP	DRY WEIGHT (GM)	ASH WEIGHT (GM)	BIOMASS (MG/CM2)	STATION AVERAGE (MG/CM2)
1A	.1686	.0242	3.851	
1B	.1402	.0230	3.659	
1C	.1770	.0253	4.045	3.852
2A	.4118	.0503	9.640	
2B	.3559	.0446	9.366	
2C	.4265	.0521	9.564	9.664
3A	.3023	.0378	7.053	
3B	.4760	.0534	11.269	
3C	.3554	.0506	8.123	8.815

Table 2.5.2-8

PERIPHYTON DENSITY AND SPECIES DIVERSITY ESTIMATES

CATHEDRAL BLUFFS SHALE OIL COMPANY
PICEANCE CREEK

STATION: 1 - STEWART STATION

REPLICATES - 3

SUBSTRATE - GLASS SLIDE

SAMPLE DATE - 052881

TAXON	REP 1	REP 2	REP 3	MEAN	S.D.	RELATIVE ABUNDANCE
BACILLARIOPHYTA						
ACHNANTHES LANCEOLATA	.00	.00	107.19	35.73	61.89	.25
ACHNANTHES MICROCEPHALA	.00	.00	107.19	35.73	61.89	.25
ACHNANTHES MINUTISSIMA	.00	492.76	214.38	235.71	247.07	1.55
AMPHORA VENETA	169.27	.00	.00	56.42	97.73	.40
CALONEIS AMPHISRAENA	.00	61.59	.00	20.53	35.56	.14
CUCONEIS FEDICULUS	84.63	61.59	.00	48.74	43.76	.34
CYCLOTELLA HENEGHINIANA	.00	61.59	214.38	91.99	110.37	.65
CYRIBELLA MINUTA	169.27	.00	.00	56.42	97.73	.40
CYRIBELLA MINUTA VAR. SILESIIACA	84.63	.00	.00	28.21	48.86	.23
CYRIBELLA TURIDA	.00	61.59	.00	20.53	35.56	.14
DIATOMA VULGAPE	84.63	.00	214.38	99.67	107.98	.70
FRAGILARIA VAUCHERIAE	84.63	123.19	321.57	176.46	127.13	1.24
GOMPHONEMA ANGUSTATUM	.00	61.59	.00	20.53	35.56	.14
GOMPHONEMA INTRICATUM	.00	61.59	214.38	91.99	110.37	.65
GOMPHONEMA OLIVACEUM	.00	61.59	.00	20.53	35.56	.14
GOMPHONEMA PARVULUM	.00	61.59	.00	20.53	35.56	.14
HANTZSCHIA AMPHYTOXYS	.00	.00	107.19	35.73	61.89	.25
NAVICULA CRYPTOCEPHALA VAR. VENETA	846.35	61.59	428.76	445.57	392.65	3.13
NAVICULA HEUFLERI	.00	184.78	.00	61.59	106.69	.43
NAVICULA LANCEOLATA	.00	61.59	.00	20.53	35.56	.14
NAVICULA MUTICA	.00	.00	107.19	35.73	61.89	.25
NAVICULA NCTHA	84.63	492.76	107.19	228.19	229.40	1.50
NAVICULA SECRETA VAR. APICULATA	592.44	1786.25	643.14	1007.28	475.09	7.07
NAVICULA VIRIDULA VAR. AVENACEA	8802.03	6159.48	1071.93	8560.15	2282.33	60.05
NITZSCHIA DENTICULA	.00	61.59	.00	20.53	35.56	.14
NITZSCHIA DISIPATA	761.71	985.52	750.32	832.52	132.62	5.34
NITZSCHIA FRUSTULUM	64.63	307.97	428.76	273.79	174.59	1.92
NITZSCHIA HOLSATICA	253.90	184.78	107.19	181.96	73.40	1.28
NITZSCHIA HUNGAPICA	169.27	.00	214.38	127.89	113.02	.93
NITZSCHIA LINEARIS	507.81	123.19	.00	210.33	264.88	1.43
NITZSCHIA PALEA	.00	677.54	750.32	475.96	412.79	3.34
RHIZOSIPHONIA CURVATA	169.27	.00	107.19	92.15	85.63	.65
RHIZOSIPHONIA MUSCULUS	84.63	.00	.00	28.21	48.86	.23
SUPIRELLA OVALIS	.00	123.19	.00	41.06	71.12	.29
SUPIRELLA OVATA	1015.62	246.38	107.19	456.40	489.28	3.20
SYMPEDRA ULNA	169.27	.00	.00	56.42	97.73	.40
DIVISION TOTAL	14218.67	12565.33	15971.20	14251.73	1703.17	100.00
TOTAL DENSITY	14218.67	12565.33	15971.20	14251.73	1703.17	100.00

DIVERSITY INDEX CALCULATIONS

SHANNON INDEX = 1.825
 VARIANCE = .0002
 MAXIMUM INDEX = 3.564
 EVENNESS = .509
 NO OF SPECIES = 36

STATION: 2 - MIDDLE STATION
 REPLICATES - 3
 SUBSTRATE - GLASS SLIDE

SAMPLE DATE - 052881

DENSITY (UNITS/MM2)

TAXON	REP 1	REP 2	REP 3	MEAN	S.D.	7 RELATIVE ABUNDANCE
PACILLARIOPHYTA						
ACHNANTHES LANCEOLATA	4990.54	2307.53	1670.26	2989.44	1762.05	42.51
ACHNANTHES LANCEOLATA VAR. DUBIA	97.85	.00	32.75	43.53	49.81	.62
ACHNANTHES MINUTISSIMA	2739.90	596.77	736.88	1357.85	1198.94	19.31
AMPHICA PERPUSILLA	46.93	.00	.00	16.31	23.25	.23
COCCONEIS PEDICULUS	638.05	99.44	147.38	294.30	296.03	4.12
COCCONEIS PLACENTULA	342.49	537.10	245.63	375.07	148.44	5.33
CYCLOTELLA MENEGHINIANA	48.93	.00	.00	16.31	28.25	.23
CYMBELLA MINUTA	.00	.00	16.39	5.46	9.45	.08
CYMBELLA SINUATA	48.93	.00	.00	16.31	28.25	.23
FRAGILARIA VAUCHERIAE	.00	.00	16.38	5.46	9.45	.08
GOMPHONEMA SUBCLAVATUM	97.85	.00	.00	32.62	56.50	.46
NAVICULA ARVENSIS	.00	19.89	.00	6.63	11.48	.09
NAVICULA CRYPTOCEPHALA VAR. VENETA	.00	.00	16.38	5.46	9.45	.08
NAVICULA LANCEOLATA	48.93	.00	.00	16.31	28.25	.23
NAVICULA MUTICA	293.56	.00	.00	97.65	149.49	1.39
NAVICULA NOTHA	.00	.00	32.75	10.92	18.91	.15
NAVICULA SECRETA VAR. APICULATA	48.93	19.89	40.13	39.31	16.02	.55
NAVICULA VIRIDULA VAR. AVENACEA	244.63	79.57	180.13	168.11	83.19	2.39
NITZSCHIA APICULATA	.00	.00	16.38	5.46	9.45	.08
NITZSCHIA DISSIPATA	48.93	.00	65.50	38.14	34.06	.54
NITZSCHIA FRUSTULUM	146.78	.00	45.13	65.30	74.72	.93
NITZSCHIA LINEARIS	.00	19.89	32.75	17.55	14.50	.25
NITZSCHIA PALEA	.00	19.89	32.75	17.55	16.50	.25
SUPPELLA OVATA	146.78	.00	81.89	76.22	73.55	1.03
DIVISION TOTAL	10030.00	3700.00	3422.40	5717.47	3737.34	31.30

CHLOROPHYTA

PALMELLA STAGE OF CHAETOPHORACEAE	2516.00	1066.67	363.73	1315.47	1097.49	18.70
DIVISION TOTAL	2516.00	1066.67	363.73	1315.47	1097.49	18.70
TOTAL DENSITY	12546.00	4766.67	3766.13	7032.93	4799.56	100.00

DIVERSITY INDEX CALCULATIONS

SHANNON INDEX = 1.764
 VARIANCE = .0002
 MAXIMUM INDEX = 3.219
 EVENNESS = .548
 NO OF SPECIES = 25

STATION: 3 - HUNTER STATION
 REPLICATES - 3
 SUBSTRATE - GLASS SLIDE

SAMPLE DATE - 052881

DENSITY (UNITS/MM²)

TAXON	REP 1	REP 2	REP 3	MEAN	S.D.	RELATIVE ABUNDANCE
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BACILLARIOPHYTA

ACHNANTHES LANCEOLATA VAR. DUBIA	1809.09	1212.99	844.21	1288.77	486.88	9.87
ACHNANTHES MINUTISSIMA	7169.38	6384.16	6493.93	6822.49	425.21	51.16
AMPHORA OVALIS	.00	63.84	.00	21.28	36.86	.16
AMPHORA PERUSILLA	67.00	127.68	.00	64.90	63.67	.50
GOMPHONEMA ANGUSTATUM	.00	319.21	.00	106.40	186.29	.81
GOMPHONEMA OLIVACEUM	201.01	.00	64.94	88.65	102.58	.68
GYRSIGMA SPENCERII	67.00	.00	.00	22.33	33.68	.17
NAVICULA CRYPTOCEPHALA VAR. VENETA	201.01	63.84	64.94	109.93	78.49	.84
NAVICULA HEUFLERI	.00	127.68	454.57	194.09	234.45	1.49
NAVICULA LANCEOLATA	.00	.00	64.94	21.65	37.49	.17
NAVICULA MENISCULUS VAR. UPSALIENSIS	67.00	.00	64.94	43.98	33.10	.34
NAVICULA SEGETA VAR. APICULATA	201.01	191.52	389.64	260.72	111.74	2.00
NAVICULA VIRIDULA VAR. AVENTICEA	1072.06	2553.66	1623.48	1749.73	748.63	13.39
NITZSCHIA COMMUNIS	.00	.00	64.94	21.65	37.49	.17
NITZSCHIA DENTICULA	.00	63.84	.00	21.28	36.86	.16
NITZSCHIA DISSIPATA	201.01	.00	194.82	131.94	114.31	1.01
NITZSCHIA FUSCULUM	268.01	63.84	194.82	175.56	103.44	1.34
NITZSCHIA HOLSATICA	335.02	.00	.00	111.67	193.42	.85
NITZSCHIA IGNORATA	67.00	.00	.00	22.33	33.65	.17
NITZSCHIA LINEARIS	.00	127.68	64.94	64.21	63.84	.49
NITZSCHIA FALSA	737.04	829.94	844.21	803.73	59.20	6.15
RHIZOSIPHONIA CURVATA	.00	127.68	.00	42.56	73.72	.33
SUPIPELLA OVALIS	.00	63.84	64.94	42.93	37.18	.33

SURIKELLA OVATA	268.01	191.52	129.88	196.47	69.20	1.50
SYNEDRA ULNA	.00	.00	64.94	21.65	37.49	.17
DIVISION TOTAL	12730.67	12512.95	11689.07	12310.89	549.41	94.25

CHLOROPHYTA

STIGEOCLONIUM TENUE	694.40	892.80	667.95	751.72	122.90	5.75
DIVISION TOTAL	694.40	892.80	667.95	751.72	122.90	5.75
TOTAL DENSITY	13425.07	13405.75	12357.01	13062.61	611.14	100.00

DIVERSITY INDEX CALCULATIONS

SHANNON INDEX = 1.822
 VARIANCE = .0002
 MAXIMUM INDEX = 3.259
 EVENNESS = .559
 NO OF SPECIES = 26

PERIPHYTON DENSITY AND SPECIES DIVERSITY ESTIMATES

CATHEDRAL BLUFFS SHALE OIL COMPANY
PICEANCE CREEK

STATION: 1 - STEWART STATION
REPLICATES - 3
SUBSTRATE - GLASS SLIDE

SAMPLE DATE - 063031

DENSITY (UNITS/MM²)

TAXON	REP 1	REP 2	PFP 3	MEAN	S.D.	% RELATIVE ABUNDANCE
BACILLARIOPHYTA						
ACHNANTHES EXIGUA VAR. CONSTRICTA	.00	11.18	.00	3.73	6.45	.08
ACHNANTHES LANCEOLATA	18.39	89.44	176.44	94.76	79.16	2.05
ACHNANTHES PINUTISSIMA	147.13	570.17	719.33	478.83	296.82	10.37
CALONEIS AMPHISRAENA	18.39	.00	.00	6.13	10.82	.13
COCconeis PEDICULUS	.00	11.18	40.72	17.30	21.04	.37
COCconeis PLACENTULA	128.74	122.58	190.01	147.24	37.15	1.19
CYCLOTHELLA MENEGHINIANA	.00	145.34	27.14	57.49	77.23	1.24
CYCLOTHELLA STELLIGERA	.00	11.18	.00	3.73	6.45	.04
CYPRILLA MINUTA	.00	11.18	27.14	12.77	13.64	.23
CYPRILLA MINUTA VAR. SILESIACA	.00	100.62	13.57	38.06	54.60	.82
DIATOMA VULGARE	18.39	22.36	27.14	22.63	4.38	.49
FRAGILARIA VAUCHERIAE	.00	89.44	67.66	52.43	45.67	1.14
GOMPHONEMA INTRICATUM	.00	11.18	13.57	9.25	7.24	.12
GOMPHONEMA OLIVACEUM	16.39	22.36	.00	13.53	11.93	.29
GYRODIGNA SPENCERII	.00	11.18	.00	3.73	6.45	.08
HANNAEA ARCUS	.00	22.36	.00	7.45	12.91	.16
MERIDION CIRCULARE	.00	33.54	.00	11.18	19.36	.24
NAVICULA CRYPTOCERATA VAR. VEIEYA	128.74	257.14	257.87	214.59	74.35	4.65
NAVICULA HALOPHILA	18.39	.00	.00	6.13	10.62	.13
NAVICULA HEUFLEI	18.39	.00	13.57	10.65	9.54	.23
NAVICULA PELLICULOSA	.00	11.18	.00	3.73	6.45	.08
NAVICULA VIRIDULA	1639.08	1117.59	977.20	1311.42	462.34	29.39
NITZSCHIA APICULATA	.00	.00	13.57	4.52	7.84	.10
NITZSCHIA DISSIPATA	36.78	268.32	271.44	192.13	134.59	4.16
NITZSCHIA FRUSTULUM	128.74	749.05	1357.22	745.00	614.25	16.13
NITZSCHIA HOLSATICA	.00	122.98	217.15	113.38	104.60	2.45
NITZSCHIA HUNGARICA	18.39	11.18	40.72	23.43	15.40	.51
NITZSCHIA LATENS	18.39	22.36	.00	13.58	11.93	.29
NITZSCHIA LINEARIS	36.78	111.60	27.14	52.57	46.34	1.27
NITZSCHIA PALEA	55.17	134.16	40.72	76.69	50.30	1.66
NITZSCHIA TRYBLIONELLA	.00	.00	13.57	4.52	7.84	.10
PINNULARIA INTERMEDIA	18.39	.00	.00	6.13	10.62	.13
RHOICOSPHERIA CURVATA	36.78	22.36	135.72	64.95	61.71	1.41
RHOIPALGODIA MUSCULUS	.00	11.18	.00	3.73	6.45	.04
SURIRELLA OVALIS	.00	11.18	13.57	8.25	7.24	.18
SURIRELLA OVATA	.00	89.44	81.43	124.39	67.59	2.69
SYNEDRA ACUS	202.30	33.54	67.66	70.58	38.47	1.53
SYNEDRA FASCICULATA	110.34	.00	.00	12.26	21.24	.27
SYNEDRA ULNA	36.78	78.26	27.14	114.83	110.60	2.49
SYNEDRA ULNA VAR. OXYRHYNCHUS	441.36	176.83	217.16	279.14	141.80	6.04
DIVISION TOTAL	3733.33	4516.67	5076.00	4442.00	674.44	76.17

CHLOROPHYTA

SCENEDESMUS QUADRICAUDA	.00	50.00	.00	16.67	28.87	.36
STIGEODONUM TENUE	.00	50.00	.00	16.67	28.87	.36
DIVISION TOTAL	.00	100.00	.00	33.33	57.74	.72

CHRYSOPHYTA

CYANOPHYTA

ANABAENA SP.	266.67	16.67	27.00	103.44	141.45	2.24
OSCILLATORIA SP.	66.67	.00	.00	22.22	33.49	.48
BATKACHOSPERMUM SP.	.00	.00	54.00	18.00	31.18	.39
DIVISION TOTAL	333.33	16.67	81.00	143.67	157.38	3.11

TOTAL DENSITY	4066.67	4633.33	5157.00	4619.00	545.31	100.00
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DIVERSITY INDEX CALCULATIONS

SHANNON INDEX = 2.637
 VARIANCE = .0004
 MAXIMUM INDEX = 3.807
 EVENNESS = .693
 NO OF SPECIES = 45

STATION 2 - MIDDLE STATION

REPLICATES - 3
 SUBSTRATE - GLASS SLIDE

SAMPLE DATE - 063081

DENSITY (UNITS/MM2)

TAXON	REP 1	REP 2	REP 3	MEAN	S.D.	RELATIVE ABUNDANCE
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BACILLARIOPHYTA

ACHNANTHES AFFINIS	.00	.00	16.34	5.45	9.43	.10
ACHNANTHES LANCEOLATA	67.89	.00	49.01	38.97	35.04	.75
ACHNANTHES LANCEOLATA VAR. OUBIA	16.97	25.30	40.01	30.43	16.62	.58
ACHNANTHES MINUTISSIMA	526.11	303.66	457.43	429.07	113.61	8.22

AMPHORA OVALIS	33.94	25.30	16.34	25.19	8.80	.48
AMPHORA PEPPIUSILLA	.00	.00	16.34	5.45	9.43	.10
AMPHORA VENETA	16.97	.00	.00	5.65	9.80	.11
COCONEIS PEDICULUS	50.91	25.30	49.01	41.74	14.27	.89
COCONEIS PLACENTULA	33.94	50.61	81.68	55.41	24.23	1.05
CYCLOTELLA MENEGHINIANA	101.83	25.30	16.34	47.82	46.98	.92
CYBELLULA MINUTA VAR. SILESIACA	16.97	.00	16.34	11.10	9.62	.21
DIATOMA TENUE VAR. ELONGATUM	.00	25.30	.00	9.43	14.61	.16
FRAGILARIA VAUCHERIAE	33.94	.00	.00	11.31	19.60	.22
GOMPHONEMA OLIVACEUM	16.97	101.22	49.01	55.73	42.52	1.07
GYRCSIGNIA SPENCERII	.00	.00	16.34	5.45	9.43	.10
HANTZSCHIA AMPHIOXYS	.00	.00	32.67	10.89	19.85	.21
NAVICULA CAPITATA	16.97	25.30	.00	14.09	12.50	.27
NAVICULA CINCTA	16.97	.00	.00	5.66	9.80	.11
NAVICULA CRYPTOCEPHALA	33.94	.00	.00	11.31	19.60	.22
NAVICULA CRYPTOCEPHALA VAR. VENETA	152.74	303.66	163.37	206.59	94.23	3.96
NAVICULA HALOPHILA	.00	50.61	.00	16.87	29.22	.32
NAVICULA HEUFLERI	33.94	50.61	16.34	33.63	17.14	.64
NAVICULA LANCEOLATA	16.97	.00	.00	5.66	9.80	.11
NAVICULA MENISCULUS VAR. UPSALIENSIS	16.97	.00	.00	5.66	9.80	.11
NAVICULA MINIMA	.00	.00	16.34	5.45	9.43	.10
NAVICULA NOTHA	.00	.00	32.67	10.89	18.85	.21
NAVICULA PROTRACTA	.00	.00	16.34	5.45	9.43	.10
NAVICULA VIRIDULA	695.83	2530.49	522.78	1249.70	1112.57	23.94
NITZSCHIA APICULATA	.00	.00	16.34	5.45	9.43	.10
NITZSCHIA DENTICULA	.00	.00	16.34	5.45	9.43	.10
NITZSCHIA DISSIPATA	1052.23	253.05	816.85	707.39	410.69	13.55
NITZSCHIA FFUSTULUM	1714.11	1062.81	1650.03	1475.65	359.97	28.27
NITZSCHIA HOLSATICA	33.94	.00	.00	11.31	19.60	.22
NITZSCHIA HUNGARICA	.00	202.44	16.34	72.93	112.46	1.40
NITZSCHIA LATENS	16.97	.00	.00	5.66	9.80	.11
NITZSCHIA LINEARIS	16.97	.00	16.34	11.10	9.62	.21
NITZSCHIA PALFA	16.97	.00	16.34	11.10	9.62	.21
PINNULARIA SP.	16.97	.00	.00	5.66	9.80	.11
RHOLOSOPHIA CURVATA	33.94	50.61	49.01	44.52	9.20	.85
SURIRELLA ANGUSTATA	.00	.00	16.34	5.45	9.43	.10
SURIRELLA CVATA	50.91	25.30	16.34	30.85	17.94	.59
SYNECRA ACUS	67.89	25.30	.00	31.06	34.31	.63
SYNECRA FASCICULATA	84.66	101.22	.00	62.03	54.34	1.13
SYNECRA MINUSCULA	16.97	.00	.00	5.66	9.80	.11
SYNECRA ULNA	33.94	303.66	130.70	156.10	136.64	2.99
SYNECRA ULNA VAR. JAKYRHYNCHUS	169.71	25.30	49.01	81.34	77.44	1.56
THALASSIOSIRA FLUVIATILIS	118.80	50.61	65.35	78.25	35.89	1.50
DIVISION TOTAL	5346.00	5643.00	4509.00	5166.00	533.04	98.97

CHLOROPHYTA

SCENEDESMUS QUADRICAUDA	54.00	.00	.00	18.00	31.18	.34
DIVISION TOTAL	54.00	.00	.00	18.00	31.18	.34

CHRYSOPHYTA

ANAPENA SP.	.00	27.00	.00	9.00	15.59	.17
OSCILLATORIA SP.	.00	61.00	.00	27.00	46.77	.52
DIVISION TOTAL	.00	108.00	.00	36.00	62.35	.69

* TOTAL DENSITY 5400.00 5751.00 4509.00 5220.00 640.27 100.00

DIVERSITY INDEX CALCULATIONS

SHANNON INDEX = 2.370
 VARIANCE = .0004
 MAXIMUM INDEX = 3.912
 EVENNESS = .606
 NO OF SPECIES = 50

STATION: 3 - HUNTER STATION
 REPLICATES - 3
 SUBSTRATE - GLASS SLIDE

SAMPLE DATE - 063081

DENSITY (UNITS/MM²)

TAXON	REP 1	REP 2	REP 3	MEAN	S.D.	% RELATIVE ABUNDANCE
BACILLARIOPHYTA						
ACHNANTHES LANCEOLATA	31.14	.00	.00	10.38	17.08	.14
ACHNANTHES LANCEOLATA VAR. DUBIA	.00	42.45	.00	14.15	24.51	.19
ACHNANTHES MINUTISSIMA	93.42	127.35	573.70	264.82	288.63	3.51
CALONEIS APHISBAENA	46.71	42.45	191.23	93.46	84.70	1.24
COCCONEIS PEDICULUS	.00	21.23	.00	7.08	12.25	.09
COCCONEIS PLACENTULA	.00	21.23	.00	7.08	12.25	.09
CYCLOTELLA MENEGHINIANA	77.85	84.90	318.72	160.49	137.05	2.13
DIATOMA VULGARE	31.14	21.23	31.87	28.08	5.95	.37
ENTOMONEIS PALUDOSA	46.71	.00	.00	15.57	26.97	.21
FRAGILARIA VAUCHERIAE	31.14	.00	.00	10.38	17.98	.14
GOMPHONEMA OLIVACEUM	.00	21.23	.00	7.08	12.25	.09
GYROSICHA SPENCEII	.00	21.23	.00	7.08	12.25	.09
HANTZSCHIA AMPHIOXYIS	15.57	.00	.00	5.19	8.99	.07
NAVICULA CRYPTOCEPHALA	31.14	.00	.00	10.38	17.08	.14
NAVICULA CRYPTOCEPHALA VAR. VENETA	202.41	148.58	.00	117.00	104.83	1.55
NAVICULA HEUFLERI	31.14	21.23	.00	17.46	15.91	.23
NAVICULA NOTHA	15.57	63.68	95.62	58.29	40.29	.77
NAVICULA VIRIDULA	1603.69	721.66	701.19	1008.85	515.25	13.35
NITZSCHIA DISSIPATA	311.40	84.90	318.72	238.34	132.93	3.16
NITZSCHIA FRUSTULUM	435.95	573.09	63.74	357.60	263.56	4.74
NITZSCHIA HUNGARICA	265.69	403.28	159.36	275.78	122.34	3.65
NITZSCHIA LATENS	15.57	.00	.00	5.19	8.99	.07
NITZSCHIA LINEARIS	805.63	764.12	446.21	673.32	197.99	8.92
NITZSCHIA OBTUSA	.00	.00	31.87	10.42	19.40	.14
NITZSCHIA PALEA	124.56	297.16	701.19	374.30	235.95	4.94
PINNULARIA SP.	.00	21.23	.00	7.08	12.25	.09
RHICODUPHENTIA CURVATA	31.14	.00	.00	10.38	17.98	.14
PHOPALODIA MUSCULUS	77.85	.00	.00	25.95	44.95	.34

SURIRELLA OVALIS	1292.29	1061.27	573.70	975.75	366.85	12.92
SUKIRELLA OVATA	31.14	21.23	.00	17.44	15.91	.23
SYNEORA ACUS	62.28	84.80	63.74	70.31	12.66	.93
SYNEORA FASCICULATA	46.71	127.35	127.49	100.52	46.60	1.33
SYNEORA PARASITICA	.00	21.23	.00	7.09	12.25	.09
SYNEORA ULNA	373.68	403.28	733.06	503.34	199.49	6.67
SYNEORA ULNA VAR. OXYRHYNCHUS	93.42	.00	63.74	52.39	47.73	.69
THALASSIOSIRA FLUVIATILIS	576.08	2122.54	3282.93	1993.82	1357.86	26.60
DIVISION TOTAL	6804.00	7344.00	8476.00	7542.00	854.38	99.88

CYANOPHYTA

OSCILLATORIA SP.	.00	27.00	.00	9.00	15.59	.12
DIVISION TOTAL	.00	27.00	.00	9.00	15.59	.12

TOTAL DENSITY	6804.00	7371.00	8478.00	7551.00	851.39	100.00
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DIVERSITY INDEX CALCULATIONS

SHANNON INDEX	2.491
VARIANCE	.0002
MAXIMUM INDEX	3.611
EVENNESS	.690
NO OF SPECIES	37

PERIPHYTON DENSITY AND SPECIES DIVERSITY ESTIMATES

CATHEDRAL BLUFFS SHALE OIL COMPANY
PICEANCE CREEK

STATION: 1 - STEWART STATION

REPLICATES - 3

SUBSTRATE - GLASS SLIDE

SAMPLE DATE - 073081

TAXON	REP 1	REP 2	REP 3	MEAN	S.D.	% RELATIVE ABUNDANCE
BACILLARIOPHYTA						
ACHNANTHES AFFINIS	.00	7.22	.00	2.41	4.17	.07
ACHNANTHES LANCEOLATA VAR. DUBIA	29.50	86.59	179.56	98.55	75.74	2.99
ACHNANTHES MINUTISSIMA	245.83	721.54	568.59	511.99	242.65	15.54
AMPHORA PERPUSILLA	.00	7.22	22.44	9.89	11.46	.30
COCCONEIS PEDICULUS	78.67	28.86	104.74	70.75	39.55	2.15
COCCONEIS PLACENTULA	280.25	505.08	531.19	438.84	137.96	13.32
CYCLOTELLA MENEGHINIANA	19.67	.00	.00	6.56	11.35	.20
CYMBELLA CISTULA	.00	.00	14.96	4.99	8.64	.15
CYMBELLA MINUTA	.00	.00	7.48	2.49	4.32	.03
CYMBELLA MINUTA VAR. SILESIACA	63.52	21.65	14.96	33.51	26.55	1.02
CYMBELLA SINUATA	16.67	.00	7.48	9.05	9.93	.27
DIATOMA VULGARE	.00	.00	7.48	2.49	4.32	.06
FRAGILARIA VAUCHERIAE	4.92	7.22	7.48	6.54	1.41	.20
GOMPHONEMA ANGUSTATUM	34.42	21.65	22.44	26.17	7.15	.79
GOMPHONEMA OLIVACEUM	.00	7.22	44.89	17.37	24.11	.53
GOMPHONEMA SUBCLAVATUM	49.17	.00	44.89	31.35	27.24	.95
HANTZSCHIA AMPHIOXYS	.00	.00	7.48	2.49	4.32	.08
HANTZSCHIA GREVILLEI	4.92	.00	.00	1.64	2.84	.05
NAVICULA CINCTA	.00	.00	7.48	2.49	4.32	.03
NAVICULA CRYPTOCEPHALA VAR. VENETA	.00	28.66	14.56	14.61	14.43	.44
NAVICULA HEUFLERI	9.83	14.43	37.41	20.56	14.77	.62
NAVICULA MENISCULUS VAR. UPSALIENSIS	.00	.00	26.93	9.98	17.24	.30
NAVICULA NOTHA	.00	7.22	56.85	22.36	32.67	.68
NAVICULA PELLICULOSA	.00	.00	65.78	29.93	51.83	.91
NAVICULA PROTACTA	4.92	.00	.00	1.64	2.84	.05
NAVICULA RHYNCHOCEPHALA	24.58	14.43	.00	13.00	12.35	.33
NAVICULA VIRIDULA	113.08	115.45	37.41	88.65	44.39	2.69
NITZSCHIA DISSIPATA	83.58	93.80	411.48	195.29	186.43	5.96
NITZSCHIA FRUSTULUM	299.92	432.93	748.15	493.66	230.21	14.93
NITZSCHIA HUNGARICA	.00	.00	7.48	2.49	4.32	.03
NITZSCHIA LINEARIS	9.83	7.22	7.48	8.18	1.44	.25
NITZSCHIA PALEA	4.92	64.94	26.93	33.25	30.15	1.01
RHOIDSOPHENA CURVATA	491.67	125.28	261.85	294.47	133.09	8.94
RHOIDOLLOIA MUSCULUS	19.67	.00	.00	6.56	11.35	.27
STAUROGONEIS SMITHII	.00	7.22	.00	2.41	4.17	.07
SUPIRELLA OVALIS	4.92	7.22	.00	4.04	3.69	.12
SUPIRELLA OVATA	4.92	.00	7.48	4.13	3.80	.13
SYNEURA ACUS	.00	14.43	.00	4.61	8.33	.15
SYNEURA FASCICULATA	5.83	.00	.00	3.23	5.63	.10
SYNEURA ULNA	19.67	14.43	14.56	16.35	2.88	.50
SYNEURA ULNA VAR. OXYRHYNCHUS	34.42	.00	14.56	16.46	17.26	.50
DIVISION TOTAL	1966.67	2366.67	3266.67	2566.67	721.11	77.91

CHLOROPHYTA

PALMELLA STAGE OF CHAETOPHORACEAE	.00	516.67	566.67	361.11	313.73	10.96
DIVISION TOTAL	.00	516.67	566.67	361.11	313.73	10.96

CHRYSOPHYTA

ANABAENA CIRCINALIS	150.00	100.00	.00	83.33	76.38	2.53
ANABAENA SP.	66.67	16.67	16.67	31.33	23.87	1.01
PHACELIUM SP.	166.67	33.33	550.00	250.00	269.22	7.59
DIVISION TOTAL	383.33	150.00	566.67	366.67	209.83	11.13
TOTAL DENSITY	2350.00	3033.33	4500.00	3274.44	1098.53	100.00

DIVERSITY INDEX CALCULATIONS

SHANNON INDEX = 2.690
 VARIANCE = .0004
 MAXIMUM INDEX = 3.807
 EVENNESS = .707
 NO. OF SPECIES = 45

STATION 2 - MIDDLE STATION

REPLICATES - 3
 SUBSTRATE - GLASS SLIDE

SAMPLE DATE - 073081

DENSITY (UNITS/MM²)

TAXON	REP 1	REP 2	REP 3	MEAN	S.D.	% RELATIVE ABUNDANCE
BACILLARIOPHYTA						
ACNANTHES LANCEOLATA	.00	68.87	.00	22.96	39.76	.19
ACNANTHES LANCEOLATA VAR. RUBIA	140.36	309.90	144.69	198.32	56.56	1.60
ACNANTHES MINUTISSIMA	5193.45	3443.34	3617.25	4084.68	964.15	33.04
AMPHORA CVALIS	.00	.00	36.17	12.06	20.89	.10
AMPHORA PERPUSILLA	.00	68.87	144.69	71.19	72.37	.53
COCconeis PEDICULUS	.00	34.43	.00	11.48	19.98	.09
COCconeis PLACENTULA	46.79	34.43	106.92	61.25	39.69	.51
CYCLOTELLA PENECHIRIANA	140.36	985.37	434.07	396.60	226.27	3.13

CYMBELLA MINUTA VAR. SILESIACA	374.30	66.87	253.21	232.13	153.81	1.89
CYMBELLA MINUTA	233.94	34.43	.00	89.46	126.30	.72
DIATOMA VULGARE	140.36	103.30	36.17	93.29	52.81	.75
FRAGILARIA VAUGHERIAE	46.79	344.33	.00	130.37	186.77	1.05
GOMPHONEMA ANGSTADTUM	116.70	68.67	795.79	679.12	559.77	5.49
GOMPHONEMA OLIVACEUM	93.58	447.63	144.69	228.63	191.37	1.85
GOMPHONEMA SUBCLAVATUM	327.52	.00	.00	109.17	189.09	.84
GOMPHONEMA TRUNCATUM	.00	.00	253.21	34.40	146.19	.63
NAVICULA CRYPTOCEPHALA VAR. VEGETA	46.79	68.87	36.17	50.61	16.69	.51
NAVICULA LANCEOLATA	46.79	.00	36.17	27.65	24.53	.22
NAVICULA MENISCULUS VAR. UPSALIENSIS	.00	.00	72.34	24.11	41.77	.20
NAVICULA NOTHA	.00	.00	36.17	12.06	20.88	.10
NAVICULA VIRIDULA	46.79	413.20	325.55	261.85	191.33	2.12
NITZSCHIA DISSIPATA	46.79	34.43	108.52	63.25	39.69	.51
NITZSCHIA PUSTULUM	318.58	1790.54	2893.80	2621.97	734.26	21.21
NITZSCHIA HUNGARICA	46.79	.00	.00	15.60	27.01	.13
NITZSCHIA LINEARIS	.00	68.87	72.34	47.07	40.80	.38
NITZSCHIA PALEA	.00	103.30	36.17	46.49	52.42	.34
PINNULARIA SP.	.00	.00	72.34	24.11	41.77	.20
RHIZOSIPHENTIA CURVATA	888.97	1721.67	1374.55	1329.40	418.27	10.75
RHOPALODIA GIBBA	.00	103.30	36.17	46.49	52.42	.34
RHOPALODIA GIBBERULA	46.79	.00	.00	15.60	27.01	.13
RHOPALODIA MUSCULUS	.00	.00	36.17	12.06	20.88	.10
STEPHANODISCUS ASTREA	93.58	.00	180.86	91.48	90.45	.74
SUFIFELLA LINEARIS	.00	.00	36.17	12.06	20.88	.10
SYNEDRA ACUS	187.15	241.03	72.34	166.84	86.16	1.35
SYNEDRA FASCICULATA	140.36	103.30	.00	81.22	72.74	.64
SYNEDRA MINUSCULA	46.79	.00	.00	15.60	27.01	.13
SYNEDRA ULNA	.00	103.30	36.17	46.49	52.42	.34
SYNEDRA ULNA VAR. OXYRHYNCHUS	140.36	68.87	36.17	81.80	53.29	.66
DIVISION TOTAL	12966.67	10433.33	11466.67	11538.89	1221.26	93.75

CHLOROPHYTA

CLADOPHYTA SP.	100.00	600.00	66.67	255.56	298.76	2.07
SCENEDESMUS QUADRICAUDA	.00	.00	66.67	22.22	39.49	.18
DIVISION TOTAL	100.00	600.00	133.33	277.78	279.55	2.25

CHRYSOPHYTA

ANABAENA CIPCINALIS	83.33	133.33	.00	72.22	47.36	.58
ANABAENA SP.	33.33	100.00	.00	44.44	50.92	.36
PHOPMIDIUM SP.	133.33	133.33	866.67	377.73	423.39	3.06
DIVISION TOTAL	250.00	366.67	866.67	494.44	327.59	4.00

TOTAL DENSITY

13216.67	11400.00	12466.67	12361.11	912.62	100.00
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DIVERSITY INDEX CALCULATIONS

SHANNON INDEX = 2.403
VARIANCE = .0002

MAXIMUM INDEX = 3.761
EVENNESS = .639
NO OF SPECIES = 43

STATION: 3 - HUNTER STATION
REPLICATES - 3
SUBSTRATE - GLASS SLIDE

SAMPLE DATE - 073081

TAXON	REP 1	REP 2	REP 3	MEAN	S.D.	% RELATIVE ABUNDANCE
BACILLARIOPHYTA						
ACHNANTHES LANCEOLATA VAR. OUBIA	222.61	893.56	375.07	495.08	345.41	2.68
ACHNANTHES MINUTISSIMA	11130.27	13375.56	9571.51	11360.45	1914.43	61.44
AMPHURA PERPUSILLA	111.30	.00	.00	37.10	64.26	.20
COCconeis PLACENTULA	111.30	.00	94.77	68.69	60.06	.37
CYCLOTILLA MENEGHINIANA	333.91	.00	94.77	142.89	172.08	.77
CYPHELLA MINUTA VAR. SILESTIACA	111.30	126.22	94.77	110.76	15.73	.60
CYMBELLA SINUATA	111.30	.00	.00	37.10	64.26	.20
DIATOMA VULGARE	111.30	.00	.00	37.10	64.26	.20
FRAGILARIA VAUCHERIAE	111.30	126.22	.00	79.17	63.97	.43
GOPHRONEMA ANGUSTATUM	222.61	631.11	1516.28	790.00	661.31	4.27
GOPHRONEMA OLIVACEUM	556.51	.00	284.30	280.27	278.28	1.52
NAVICULA CRYPTOCEPHALA VAR. VENETA	445.21	376.67	94.77	306.21	186.12	1.66
NAVICULA LANCEOLATA	.00	.00	94.77	31.59	54.71	.17
NAVICULA MENISCULUS VAR. UPSALIENSIS	111.30	.00	94.77	68.69	60.06	.37
NAVICULA PLOTTRACTA	.00	.00	94.77	31.59	54.71	.17
NAVICULA RHYNCHOCEPHALA	.00	.00	94.77	31.59	54.71	.17
NAVICULA VIRIDULA	1113.03	631.11	473.84	739.33	333.05	4.00
NITZSCHIA DISSIPATA	1335.63	1136.00	663.37	1045.00	345.24	5.65
NITZSCHIA FRUSTULUM	1558.24	1006.78	1326.74	1298.25	275.34	7.02
NITZSCHIA FALEA	111.30	.00	94.77	68.69	60.06	.37
K-CYCLOSPHENIA CURVATA	1113.03	506.89	1137.21	915.38	353.29	4.97
SURIRELLA OVATA	111.30	.00	.00	37.10	64.26	.20
SYNEDRA ACUS	222.61	.00	.00	74.20	128.52	.40
SYNEDRA ULNA	111.30	126.22	94.77	110.76	15.73	.60
DIVISION TOTAL	19366.67	18933.33	16300.00	18200.00	1659.65	98.44

CHLOPPOPHYTA

CLADOPHORA SP.	66.67	.00	.00	22.22	39.49	.12
DIVISION TOTAL	66.67	.00	.00	22.22	39.49	.12

CHRYSOPOPHYTA

DINOBYON SP.	.00	33.33	11.11	19.25	.06
ANABAENA CIRCINALIS	200.00	200.00	188.89	19.25	1.02
PHORMIDIUM SP.	200.00	.00	66.67	115.47	.36
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DIVISION TOTAL	400.00	232.33	266.67	120.19	1.44
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TOTAL DENSITY	19833.33	16533.33	15498.59	1732.80	190.00
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DIVERSITY INDEX CALCULATIONS

SHANNON INDEX = 1.659
 VARIANCE = .0001
 MAXIMUM INDEX = 3.332
 EVENNESS = .494
 NO OF SPECIES = 28

PERIPHYTON DENSITY AND SPECIES DIVERSITY ESTIMATES

CATHEDRAL BLUFFS SHALE OIL COMPANY
PICEANCE CREEK

STATION: 1 - STEWART STATION
REPLICATES - 3
SUBSTRATE - GLASS SLIDE

SAMPLE DATE - 083181

DENSITY (UNITS/MM2)

TAXON	REP 1	REP 2	REP 3	MEAN	S.D.	% RELATIVE ABUNDANCE
BACILLARIOPHYTA						
ACHNANTHES AFFINIS	10.07	.00	.00	3.36	5.82	.05
ACHNANTHES LANCEOLATA VAR. DUBIA	30.22	49.49	73.60	51.11	21.73	.75
ACHNANTHES MINUTISSIMA	50.37	49.49	236.20	113.02	109.28	1.65
APHORA PERPUSILLA	.00	.00	18.40	6.13	10.62	.09
ASTERIONELLA FURCATA	.00	7.07	.00	2.36	4.03	.03
COCCONEIS PEDICULUS	40.30	77.78	.00	39.36	33.20	.58
COCCONEIS PLACENTULA	322.39	282.83	220.80	275.34	51.20	4.06
CYCLOTELLA MENECHINIANA	60.45	28.28	126.80	72.51	51.33	1.07
CYMATOPLEURA ELLIPTICA	.00	.00	18.40	6.13	10.62	.09
CYMBELLA MICROCEPHALA	10.07	.00	.00	3.36	5.82	.05
CYMBELLA MINUTA VAR. SILESTACA	80.60	63.64	110.40	84.83	23.67	1.25
CYMBELLA SINUATA	.00	14.14	.00	4.71	8.15	.07
CYMBELLA TUMIDA	10.07	.00	.00	3.36	5.82	.05
DENTICULA ELEGANS	.00	7.07	.00	2.36	4.03	.03
DIATOMA VULGARE	130.97	14.14	18.40	54.50	66.26	.30
EPITHEMIA SOREX	10.07	7.07	10.40	11.65	5.87	.17
FRAGILARIA CAPUCINA	30.22	49.49	126.80	69.51	52.25	1.02
FRAGILARIA CONSTRUENS VAR. VENETA	20.15	.00	.00	6.72	11.63	.10
FRAGILARIA CROTONENSIS	161.19	325.25	36.80	176.42	144.68	2.57
FRAGILARIA LEPTOSTAUPON	.00	.00	18.40	6.13	10.62	.09
FRAGILARIA VAUCHERIAE	141.04	155.56	276.00	190.87	74.09	2.81
GOMPHONEMA ANGUSTATUM	473.51	183.64	552.01	403.12	193.92	5.94
GOMPHONEMA INTRICATUM	.00	21.21	.00	7.07	12.25	.10
GOMPHONEMA OLIVACEUM	40.30	49.49	18.40	36.06	15.97	.53
GOMPHONEMA SUBCLAVATUM VAR. UPSALIEN	100.75	14.14	.00	38.30	54.54	.55
NAVICULA ARVENSIS	.00	7.07	.00	2.36	4.03	.03
NAVICULA CINCTA	40.30	14.14	.00	18.15	20.45	.27
NAVICULA CRYPTOCOPHALA	10.07	.00	.00	3.36	5.82	.05
NAVICULA CRYPTOCOPHALA VAR. VENETA	221.64	77.78	202.40	167.27	78.10	2.46
NAVICULA HALOPHILA	.00	7.07	.00	2.36	4.03	.03
NAVICULA HEUFELERI	20.15	28.28	18.40	22.29	5.27	.33
NAVICULA LARCEGLATA	10.07	7.07	18.40	11.65	5.87	.17
NAVICULA MENISCULUS VAR. UPSALIENSIS	.00	.00	18.40	6.13	10.62	.09
NAVICULA NOTHA	60.45	42.42	36.80	46.56	12.35	.69
NAVICULA PELLICULOSA	.00	7.07	18.40	8.49	5.28	.13
NAVICULA PHOTRACTA	30.22	7.07	.00	12.43	15.91	.18
NAVICULA PYCHAEA	.00	7.07	.00	2.36	4.03	.03
NAVICULA RHYNCHOCEPHALA	110.82	7.07	110.40	76.10	59.78	1.12
NAVICULA SALINARUM VAR. INTERMEDIA	10.07	.00	.00	3.36	5.82	.05
NAVICULA SECRETA VAR. APICULATA	30.22	.00	.00	10.07	17.45	.15
NAVICULA VIRIDULA VAR. AVENACEA	110.82	42.42	220.90	124.69	99.09	1.84
NITZSCHIA COMMUNIS	.00	.00	18.40	6.13	10.62	.09
NITZSCHIA DISSIPATA	352.61	707.07	993.62	684.43	321.10	10.08

NITZSCHIA FRUSTULUM	1007.46	445.45	1840.03	1097.65	701.65	16.17
NITZSCHIA HOLSATICA	302.24	551.52	368.01	407.25	129.19	6.03
NITZSCHIA HUNGARICA	70.52	7.07	.00	25.86	34.84	.38
NITZSCHIA IGORATA	20.15	21.21	36.80	26.05	9.32	.38
NITZSCHIA LINEARIS	241.79	146.48	331.21	240.49	91.37	3.54
NITZSCHIA PALEA	342.54	374.75	736.01	444.43	218.47	7.14
NITZSCHIA FOANA	.00	7.07	.00	2.36	4.08	.03
PINNULARIA SP.	.00	.60	16.40	6.13	10.62	.03
PLEUROSIGMA DELICATISSIMA	.00	28.28	.00	9.43	14.33	.14
RHICOSPHERIA CURVATA	50.37	26.28	18.40	32.35	16.37	.48
RHOPALOGIA GIBBA	46.30	21.21	.00	20.50	20.16	.30
RHCPALODIA MUSCULUS	30.22	49.49	16.40	32.71	15.70	.48
SYNEDRA ACUS	211.57	21.21	331.21	147.99	154.34	2.77
SYNEDRA FASCICULATA	241.79	14.14	294.41	183.45	148.94	2.70
SYNEDRA MINUSCULA	.00	21.21	.00	7.07	12.25	.10
SYNEDRA PARASITICA	.00	7.07	18.40	8.49	9.28	.13
SYNEDRA ULNA	40.30	35.35	73.60	49.75	20.40	.73
SYNEDRA ULNA VAR. OXYRHYNCHUS	70.52	56.57	165.60	97.56	59.34	1.44
DIVISION TOTAL	5400.00	4200.00	7793.33	5794.44	1873.94	85.35

CHLOROPHYTA

ORAPARNALDIA SP.	1333.33	733.33	583.33	843.33	336.86	13.01
DIVISION TOTAL	1333.33	733.33	583.33	843.33	336.86	13.01

CHRYSTOPHYTA

ANABAENA SP.	.00	83.33	250.00	111.11	127.29	1.64
DIVISION TOTAL	.00	83.33	250.00	111.11	127.29	1.64

TOTAL DENSITY	6733.33	5016.67	5616.67	6798.89	1800.64	100.00
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DIVERSITY INDEX CALCULATIONS

SHANNON INDEX	3.065
VARIANCE	.0002
MAXIMUM INDEX	4.143
EVENNESS	.740
NO OF SPECIES	63

STATION 2 - MIDDLE STATION
 REPLICATES - 3
 SUBSTRATE - GLASS SLIDE

SAMPLE DATE - 083181

DENSITY (UNITS/MM²)

TAXON REP 1 REP 2 REP 3 MEAN S.D. x RELATIVE ABUNDANCE

BACILLARIOPHYTA

ACHNANTHES LANCEOLATA VAR. DUBIA	.00	.00	56.67	18.69	32.72	.17
ACHNANTHES MINUTISSIMA	769.70	393.42	396.71	519.64	216.30	4.65
AMPHORA OVALIS	.00	26.23	.00	8.74	15.14	.09
AMPHORA PERPUSILLA	38.48	.00	37.78	25.42	22.02	.23
COCconeis PEDICULUS	.00	131.14	.00	43.71	75.71	.39
COCconeis PLACENTULA	269.39	498.33	302.26	356.66	123.79	3.19
CYCLOTELLA HENEGHNIANA	192.42	314.74	94.46	200.54	110.36	1.79
CYATOPLEURA ELLIPTICA	38.48	.00	.00	12.83	22.22	.11
CYBELL A MINUTA VAR. SILESIACA	153.94	314.74	151.13	206.60	93.66	1.95
CYBELL A TUMIDA	.00	26.23	.00	8.74	15.14	.03
DIATOMA TENUE VAR. ELONGATUM	2078.18	839.30	831.21	1249.56	717.62	11.18
DIATOMA VULGARE	76.97	26.23	37.78	46.99	26.63	.42
FRAGILARIA CAPUCINA	115.45	289.51	340.04	248.00	117.64	2.22
FRAGILARIA CROTONENSIS	3849.48	1154.04	1907.99	2303.50	1390.08	20.62
FRAGILARIA VAUCHERIAE	269.39	131.14	94.46	165.00	92.25	1.48
GOMPHONEMA ACUMINATUM	.00	76.68	.00	26.23	45.43	.23
GOMPHONEMA ANGUSTATUM	423.33	26.23	151.13	200.23	203.03	1.79
GOMPHONEMA INTPICATUM	.00	26.23	.00	8.74	15.14	.09
GOMPHONEMA OLIVACEUM	307.88	.00	18.69	108.92	172.56	.97
GOMPHONEMA SUBCLAVATUM VAR. UPSALIEN	38.48	.00	.00	12.83	22.22	.11
GOMPHONEMA TRUNCATUM	76.97	26.23	.00	34.40	32.13	.31
HAUTSCHIA AMPHIKXYS	.00	26.23	.00	8.74	15.14	.38
NAVICULA CRYPTOCEPHALA VAR. VENETA	423.33	314.74	283.37	340.43	73.45	3.05
NAVICULA HALOPHILA	115.45	.00	.00	38.48	66.66	.34
NAVICULA HEUFELI	115.45	26.23	113.35	85.01	50.92	.76
NAVICULA NOTHA	.00	157.37	75.56	51.42	44.55	.46
NAVICULA RHYNCHOCEPHALA	.00	131.14	37.78	65.05	82.15	.58
NAVICULA VIRIDULA VAR. AVENACEA	76.97	.00	27.69	144.93	75.81	1.30
NAVICULA COMMUNIS	.00	.00	18.69	6.30	10.91	.06
NITZSCHIA DENTICULA	38.48	.00	.00	12.83	22.22	.11
NITZSCHIA LISSIPATA	307.88	78.68	302.26	229.61	130.73	2.06
NITZSCHIA FRUSTULUM	384.85	550.79	226.69	387.44	162.04	3.47
NITZSCHIA POLSATICA	.00	76.68	264.47	114.39	135.80	1.02
NITZSCHIA HUNGARICA	76.97	.00	18.69	31.95	40.11	.29
NITZSCHIA LINEARIS	76.97	236.05	56.67	123.23	98.23	1.10
NITZSCHIA PALEA	.00	183.60	340.04	174.55	170.20	1.56
NITZSCHIA SIGMOIDEA	307.88	.00	.00	102.63	177.75	.92
PLEUPOSICOMA DELICATISSIMA	38.48	.00	37.78	25.42	22.02	.23
RHODOSPHEMIA CURVATA	269.39	262.28	18.69	183.52	142.62	1.64
SURIKELLA OVALIS	.00	.00	37.78	12.59	21.81	.11
SURIKELLA OVATA	.00	26.23	18.69	15.04	13.53	.13
SYNEURA ACUS	692.73	104.91	52.95	442.20	303.36	3.96
SYNEURA FASCICULATA	269.39	2675.26	1322.37	1422.34	1206.05	12.73
SYNEURA MINUSCULA	.00	.00	18.69	6.30	10.91	.06
SYNEURA PULCHELLA VAR. LANCEOLATA	461.67	262.28	75.56	266.55	193.14	2.39
SYNEURA ULNA	230.91	157.37	.00	129.43	117.94	1.16
SYNEURA ULNA VAR. JXRYRHYNCHUS	115.45	314.74	1322.37	584.19	647.01	5.23
DIVISION TOTAL	12700.00	9366.67	9766.67	10811.11	1638.83	96.77

CHLOROPHYTA

DRAPARNALOIDA SP.	83.33	400.00	400.00	294.44	182.83	2.64
SPIROGYRA SP.	33.33	.00	.00	11.11	19.25	.10
DIVISION TOTAL	116.67	400.00	400.00	305.56	163.58	2.73

CHRYSOPHYTA

DINOBRYON SP.	.00	33.33	.00	11.11	19.25	.10
ANAPAENA SP.	33.33	33.33	.00	22.22	19.25	.20
PHORMIDIUM SP.	66.67	.00	.00	22.22	38.49	.20
DIVISION TOTAL	100.00	66.67	.00	55.56	50.02	.50

TOTAL DENSITY	12916.67	10433.33	10166.67	11172.22	1516.61	100.00
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DIVERSITY INDEX CALCULATIONS

SHANNON INDEX = 2.998
 VARIANCE = .0001
 MAXIMUM INDEX = 3.951
 EVENNESS = .759
 NO OF SPECIES = 52

STATION: 3 - HUNTER STATION
 REPLICATES - 3
 SUBSTRATE - GLASS SLIDE

SAMPLE DATE - 083181

DENSITY (UNITS/MM2)

TAXON	REP 1	REP 2	REP 3	MEAN	S.D.	RELATIVE ABUNDANCE
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BACILLARIOPHYTA

ACHNANTHES LANCEOLATA VAR. DUBIA	10.61	194.75	.00	68.45	109.51	.46
ACHNANTHES MINUTISSIMA	254.61	6491.71	5335.37	4027.23	3317.95	26.95
AMPHORA PERPUSILLA	.00	324.59	104.71	143.74	145.44	.94
COCconeis FLACENTULA	42.44	324.59	160.06	175.69	141.72	1.18
CYCLOTELLA MERECHINIANA	42.44	649.17	373.48	355.03	303.79	2.38
CYPBELLA MINUTA VAR. SILESTIACA	31.83	1947.51	960.37	979.90	957.99	6.56
CYMBELLA SINUATA	.00	64.92	.00	21.64	37.48	.14
DIATOMA TENUE VAR. ELONGATUM	.00	64.92	.00	21.64	37.49	.14
DIATOMA VULGARE	.00	64.92	.00	21.64	37.48	.14
FRAGILARIA CROTONENSIS	.00	64.92	.00	21.64	37.49	.14
FRAGILARIA LEPTOSTAURON	.00	64.92	.00	21.64	37.49	.14
FRAGILARIA VAUCHERIAE	10.61	64.92	.00	25.13	34.82	.17

GOPHONEMA ANGUSTATUM	159.13	3375.69	2134.15	1889.66	1422.16	12.65
GOPHONEMA OLIVACEUM	10.61	649.17	533.54	397.77	340.24	2.66
GOPHONEMA SUBCLAVATUM VAR. UPSALIEN	.00	.00	266.77	98.92	154.02	.43
NAVICULA CRYPTOCEPHALA VAR. VENETA	74.26	129.83	440.19	228.09	220.03	1.51
NAVICULA HEUFELERI	.00	194.75	53.35	82.70	130.64	.55
NAVICULA LANCEOLATA	10.61	.00	.00	3.54	6.13	.02
NAVICULA MINIMA	10.61	.00	.00	3.54	6.13	.02
NAVICULA NOTHA	.00	64.92	320.12	129.35	162.22	.46
NAVICULA PROTRACTA	.00	64.92	.00	21.64	37.48	.14
NAVICULA PYGMAEA	10.61	.00	.00	3.54	6.13	.02
NAVICULA SECRETA VAR. APICULATA	53.04	64.92	.00	39.32	34.57	.26
NAVICULA TRIUNCTATA VAR. SCHIZONEHO	.00	194.75	.00	64.92	112.44	.43
NAVICULA VIRIDULA VAR. AVENACEA	63.65	1622.93	2134.15	1273.58	1073.55	8.52
NITZSCHIA DENTICULA	.00	64.92	.00	21.64	37.48	.14
NITZSCHIA DISSIPATA	1135.15	4479.29	2987.60	2867.41	1675.31	19.13
NITZSCHIA FRUSTULUM	127.31	519.34	1173.78	606.81	528.69	4.06
NITZSCHIA HUNGARICA	.00	64.92	.00	21.64	37.48	.14
NITZSCHIA LINEARIS	.00	64.92	.00	21.64	37.48	.14
NITZSCHIA OPTUSA	10.61	.00	.00	3.54	6.13	.02
NITZSCHIA PALEA	42.44	129.83	.00	57.42	66.20	.35
RHODOSPHEMIA CURVATA	10.61	973.76	426.83	470.40	483.05	3.15
SURIKELLA ANGUSTATA	.00	64.92	.00	21.64	37.48	.14
SURIKELLA OVALIS	.00	194.75	53.35	82.70	100.64	.55
SURIKELLA OVATA	10.61	64.92	.00	25.18	34.82	.17
SYNEDRA FASCICULATA	31.63	.00	.00	10.61	18.36	.07
SYNEDRA PULCHELLA VAR. LANCEOLATA	.00	64.92	.00	21.64	37.48	.14
SYNEDRA ULNA	21.22	129.83	.00	50.34	69.65	.34
SYNEDRA ULNA VAR. OXYRHYNCHUS	10.61	.00	.00	3.54	6.13	.02
DIVISION TOTAL	2185.43	23500.00	17500.00	14395.14	10991.26	96.34

CHLOROPHYTA

SCENEDESMUS QUADRICAUDA	3.31	.00	.00	1.10	1.91	.01
SPIROGYRA SP.	.00	33.33	.00	11.11	19.25	.07
DIVISION TOTAL	3.31	33.33	.00	12.21	19.36	.09

CHRYSOPHYTA

ANABAENA SP.	6.62	33.33	.00	13.32	17.65	.09
OSCILLATORIA SP.	16.56	130.00	.00	38.85	53.60	.26
PHURIDIUM SP.	13.25	433.33	1000.00	482.19	495.19	3.23
DIVISION TOTAL	36.42	566.67	1000.00	534.36	492.60	3.58

TOTAL DENSITY

2225.17	24100.00	18500.00	14941.72	11343.23	170.00
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DIVERSITY INDEX CALCULATIONS

SHANNON INDEX = 2.418
 VARIANCE = .0001
 MAXIMUM INDEX = 3.807
 EVENNESS = .635

NO OF SPECIES - 45

III-107

PERIPHYTON DENSITY AND SPECIES DIVERSITY ESTIMATES

CATHEDRAL BLUFFS SHALE OIL COMPANY
PICEANCE CREEK

STATION 1 - STEWART STATION

REPLICATES - 3
SUBSTRATE - GLASS SLIDE

SAMPLE DATE - 093081

DENSITY (UNITS/MM²)

TAXON	REP 1	REP 2	REP 3	MEAN	S.D.	% RELATIVE ABUNDANCE
BACILLARIOPHYTA						
ACHNANTHES LANCEOLATA	18.82	.00	.00	6.27	10.86	.13
ACHNANTHES LANCEOLATA VAR. DUBIA	301.08	855.49	853.42	670.00	319.40	14.26
ACHNANTHES MINUTISSIMA	809.14	394.84	1453.12	895.70	533.28	18.84
APHGRA OVALIS	.00	.00	23.07	7.69	13.32	.16
APHORA PEFFUSILLA	.00	.00	23.07	7.69	13.32	.16
COCconeis PEGICULUS	37.03	.00	.00	12.54	21.73	.27
COCconeis PLACENTULA	1881.72	1316.14	2306.55	1834.80	496.87	39.04
CYMBELLA MINUTA VAR. SILESIACA	18.82	39.48	23.07	27.12	10.91	.58
CYMBELLA MINUTA	.00	13.16	.00	20.85	19.84	.44
DIATOMA VULGARE	.00	13.16	.00	4.39	7.60	.09
FRAGILARIA VAUCHERIAE	56.45	105.29	.00	23.20	29.54	.49
GOMPHONEMA ANGUSTATUM	94.09	.00	.00	66.46	57.83	1.41
GOMPHONEMA PARVULUM	.00	.00	46.13	15.33	26.63	.33
GOMPHONEMA SUBCLAVATUM	.00	92.13	46.13	46.09	46.06	.98
NAVICULA APVENSIS	.00	13.16	23.07	12.08	11.57	.26
NAVICULA CRYPTOCEPHALA VAR. VENETA	.00	13.16	.00	4.39	7.60	.09
NAVICULA HEUFLEI	.00	.00	46.13	15.33	26.63	.33
NAVICULA NOTHA	.00	26.32	23.07	16.46	14.35	.35
NAVICULA RHYNCHOCEPHALA	56.45	.00	46.13	34.19	30.04	.73
NAVICULA VIRIDULA VAR. AVENACEA	18.82	26.32	23.07	22.74	3.76	.48
NITZSCHIA DISSIPATA	.00	39.48	.00	13.16	22.83	.28
NITZSCHIA FRUSTULUM	18.82	13.16	92.26	41.41	44.13	.88
NITZSCHIA IGROPATA	.00	52.65	46.13	32.93	28.70	.70
NITZSCHIA PALEA	37.63	39.48	23.07	33.39	8.99	.71
RHOICOSPHEA CURVATA	131.72	92.13	23.07	82.31	54.99	1.75
SYNEDRA ULNA	18.82	131.61	23.07	57.83	63.93	1.23
DIVISION TOTAL	3500.00	3316.67	5166.67	3994.44	1019.30	34.99

CHLOROPHYTA

PALMELLA STAGE OF CHAETOPHORACEAE	700.00	950.00	433.33	694.44	259.38	14.78
DIVISION TOTAL	700.00	950.00	433.33	694.44	259.38	14.78

CHRYSOPHYTA

DINOBRYON SP.	16.67	.00	.00	5.56	9.62	.12
ANABAENA SP.	16.67	.00	.00	5.56	9.62	.12

6 DIVISION TOTAL 33.33 .00 .00 11.11 19.25 .24

TOTAL DENSITY 4233.33 4266.67 5600.00 4700.00 779.60 100.00

DIVERSITY INDEX CALCULATIONS

SHANNON INDEX = 1.889
 VARIANCE = .0004
 MAXIMUM INDEX = 3.367
 EVENNESS = .561
 NO OF SPECIES = 29

STATION: 2 - MIDDLE STATION
 REPLICATES - 3
 SUBSTRATE - GLASS SLIDE

SAMPLE DATE - 093081

DENSITY (UNITS/MM2)

TAXON REP 1 REP 2 REP 3 MEAN S.D. % RELATIVE ABUNDANCE

BACILLARIOPHYTA

ACHNANTHES LANCEOLATA VAR. OUBIA	312.20	417.86	860.39	530.15	290.83	3.73
ACHNANTHES MINUTISSIMA	4459.93	5223.29	6750.72	5477.99	1166.44	39.16
AMPHORA PEPPUSILLA	.00	261.16	.00	87.05	150.78	.62
COCconeis PEDICULUS	44.60	.00	.00	14.87	25.75	.11
COCconeis PLACENTULA	3701.74	1410.29	926.57	2012.87	1482.47	14.39
CYCLotella MENEGHINIANA	44.60	.00	661.64	235.43	369.91	1.68
CYMBELLA AFFINIS	.00	52.23	.00	17.41	30.16	.12
CYMBELLA MINUTA	.00	.00	66.14	22.06	34.21	.16
CYMBELLA MINUTA VAR. SILESIACA	356.79	313.40	132.37	267.52	119.04	1.91
CYMBELLA SINUATA	.00	52.23	66.18	39.47	34.69	.28
DIATOMA TENUE VAR. ELONGATUM	.00	52.23	.00	17.41	30.16	.12
FRAGILARIA CAPICINA	44.60	.00	.00	14.87	25.75	.11
FRAGILARIA CROTONEINSIS	.00	522.33	264.73	262.35	261.17	1.88
FRAGILARIA VAUCHERIAE	85.20	52.23	66.18	60.21	19.67	.49
GOMPHONEMA ANGUSTATUM	1783.97	783.49	1191.30	1252.92	501.09	8.96
GOMPHONEMA OLIVACEUM	445.99	104.47	397.10	315.85	184.69	2.26
GOMPHONEMA SUBCLAVATUM	.00	52.23	.00	17.41	30.16	.12
GYROSIGMA SPENCERII	.00	.00	66.18	22.06	34.21	.16
Hantzschia AMPHIOXYS	.00	.00	66.18	22.06	34.21	.16
NAVICULA CRYPTOCEPHALA VAR. VENETA	178.50	156.70	264.73	199.94	57.15	1.43
NAVICULA GUTLANDICA	44.60	.00	.00	14.87	25.75	.11
NAVICULA LANCEOLATA	44.60	.00	.00	14.87	25.75	.11
NAVICULA NCTHA	44.60	.00	.00	14.87	25.75	.11
NAVICULA VIFIDULA VAR. AVENACEA	89.20	104.47	198.55	130.74	59.22	.93

NITZSCHIA COMMUNIS	.00	.00	66.18	22.06	38.21	.16
NITZSCHIA DISSIPATA	223.00	52.23	264.73	179.99	112.59	1.29
NITZSCHIA FRUSTULUM	356.79	313.40	924.57	532.25	342.18	3.80
NITZSCHIA HOLSATICA	.00	52.23	.00	17.41	30.16	.12
NITZSCHIA LINEARIS	.00	52.23	.00	17.41	30.16	.12
NITZSCHIA PALEA	44.60	52.23	.00	32.29	28.21	.23
RHODOSPHERIA CURVATA	445.99	679.03	397.10	507.37	150.65	3.63
SYNECRA ULNA	44.60	156.70	66.18	89.16	59.48	.64
DIVISION TOTAL	12800.00	10916.67	13700.00	12472.22	1420.32	49.16

CHLOROPHYTA

PALPELLA STAGE OF CHAETOPHORACEAE	1733.33	1183.33	1150.00	1355.56	327.59	9.69
STIGEOCLONIUM TENUE	.00	.00	200.00	66.67	115.47	.48
DIVISION TOTAL	1733.33	1183.33	1350.00	1422.22	232.02	10.17

CHRYSOPHYTA

ANABRENA SP.	.00	50.00	16.67	22.22	25.46	.16
OSCILLATORIA SP.	.00	.00	133.33	44.44	76.98	.32
PHOPPIDIUM SP.	.00	16.67	66.67	27.78	34.69	.20
DIVISION TOTAL	.00	66.67	216.67	94.44	110.97	.69

TOTAL DENSITY

14533.33	12166.67	15266.67	13988.89	1620.13	100.00
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DIVERSITY INDEX CALCULATIONS

SHANNON INDEX = 2.228
 VARIANCE = .0001
 MAXIMUM INDEX = 3.611
 EVENNESS = .617
 NO OF SPECIES = 37

STATION: 3 - HUNTER STATION
 REPLICATES - 3
 SUBSTRATE - GLASS SLIDE

SAMPLE DATE - 093081

TAXON	REP 1	REP 2	REP 3	MEAN	S.D.	% RELATIVE ABUNDANCE
DENSITY (UNITS/MM ²)						

BACILLARIOPHYTA

ACHNANTHES AFFINIS	.00	81.89	.00	27.30	47.28	.18
ACHNANTHES LANCEOLATA	51.17	.00	.00	17.06	29.54	.11
ACHNANTHES LANCEOLATA VAR. RUBIA	307.00	.00	132.63	146.54	153.97	.97
ACHNANTHES MINUTISSIMA	5116.67	8434.45	3315.77	5622.30	2596.53	37.37
COCONEIS PLACENTULA	102.33	491.33	596.84	336.83	260.44	2.64
CYCLotella RENEGHINIANA	102.33	163.78	497.37	254.49	212.57	1.69
CYMBELLA MINUTA VAR. SILESIAICA	1432.67	1883.42	1061.05	1459.05	411.82	9.70
CYMBELLA SINUATA	51.17	.00	.00	17.06	29.54	.11
DIATOMA VULGARE	255.83	.00	.00	85.28	147.71	.57
FRAGILARIA CROTONEENSIS	51.17	.00	.00	17.06	29.54	.11
FRAGILARIA VAUCHERIAE	.00	.00	66.32	22.11	38.29	.15
GOMPHONEMA ANGUSTATUM	1790.83	1965.31	862.10	1539.41	593.02	10.23
GOMPHONEMA OLIVACEUM	153.50	.00	132.63	95.39	83.26	.63
GOMPHONEMA SUBCLAVATUM	51.17	163.78	.00	71.65	83.79	.49
NAVICULA CINCTA	307.00	.00	33.16	113.39	161.49	.75
NAVICULA CRYPTOCOPHALA VAR. VENETA	153.50	409.44	663.15	408.70	256.83	2.72
NAVICULA HZUFLEI	.00	163.78	232.10	111.96	119.28	.89
NAVICULA LAPCEOLATA	.00	.00	33.16	11.05	19.14	.07
NAVICULA MINIMA	.00	.00	99.47	33.16	57.43	.22
NAVICULA NUTHA	.00	.00	66.32	22.11	35.29	.15
NAVICULA PROTRACTA	.00	.00	33.16	11.05	19.14	.07
NAVICULA VIRIDULA	51.17	.00	.00	17.06	29.54	.11
NAVICULA VIRIDULA VAR. AVENACEA	.00	736.99	33.16	256.72	416.26	1.71
NITZSCHIA DISSIPATA	665.17	900.77	1094.20	885.71	216.86	5.89
NITZSCHIA FRUSTULUM	1483.83	1637.76	894.26	1336.95	391.89	9.90
NITZSCHIA HUNGARICA	.00	.00	33.16	11.05	19.14	.07
NITZSCHIA ICNORATA	.00	327.55	.00	109.13	189.11	.73
NITZSCHIA LINEARIS	.00	.00	33.16	11.05	19.14	.07
NITZSCHIA PALZA	.00	327.55	196.95	175.50	165.03	1.17
NITZSCHIA TRYBLIONELLA	.00	81.69	33.16	38.35	41.19	.25
PLEUROSIGMA DELICATISSIMA	.00	.00	33.16	11.05	19.14	.07
PHOICOSPHENIA CURVATA	153.50	409.44	530.52	364.49	192.49	2.42
SURIPELLA OVATA	.00	.00	33.16	11.05	19.14	.07
THALASSIOSIRA FLUVIATILIS	.00	327.55	232.10	186.59	168.46	1.24
DIVISION TOTAL	12280.00	18506.67	10975.20	13920.62	4024.86	92.53

CHLOROPHYTA

STIGEODONUM TENUE	2106.67	613.33	290.20	1006.40	955.72	6.69
DIVISION TOTAL	2106.67	613.33	290.20	1006.40	955.72	6.69

CHRYSDOPHYTA

DACTYLOCOCCOPSIS SP.	.00	26.67	.00	8.89	15.40	.06
OSCILLATORIA SP.	.00	133.33	190.40	107.91	97.71	.72
DIVISION TOTAL	.00	160.00	190.40	116.80	103.20	.76
TOTAL DENSITY	14386.67	19280.00	11464.80	15043.82	3948.83	100.00

DIVERSITY INDEX CALCULATIONS

SHANNON INDEX = 2.327
 VARIANCE = .0001
 MAXIMUM INDEX = 3.611
 EVENNESS = .644
 NO OF SPECIES = 37

PERIPHYTON DENSITY AND SPECIES DIVERSITY ESTIMATES

CATHEDRAL BLUFFS SHALE OIL COMPANY
PICEANCE CREEK

STATION 1 - STEWART STATION

REPLICATES - 3

SUBSTRATE - GLASS SLIDE

SAMPLE DATE - 102981

DENSITY (UNITS/MM2)

TAXON	REP 1	REP 2	REP 3	MEAN	S.D.	% RELATIVE ABUNDANCE
BACILLARIOPHYTA						
ACHNANTHES AFFINIS	15.95	.00	.00	5.32	9.21	.04
ACHNANTHES LANCEOLATA VAR. DUBIA	.00	319.46	297.56	205.67	178.45	1.56
ACHNANTHES LINEARIS	.00	16.81	.00	5.60	9.71	.04
ACHNANTHES MINUTISSIMA	207.39	722.98	66.12	332.17	345.75	2.53
AMPHORA OVALIS	63.81	.00	45.59	37.80	33.50	.29
AMPHORA PERPUSILLA	.00	50.44	33.06	27.83	25.62	.21
COCCONEIS PECTICULUS	31.91	100.89	45.59	60.79	35.83	.46
COCCONEIS PLACENTULA	255.25	470.78	264.50	330.18	121.85	2.51
CYCLotella MENEGHINIANA	223.35	487.59	475.40	336.79	150.25	3.02
CYATOPLEURA ELLIPTICA	.00	.00	16.53	5.51	9.54	.04
CYRABELLA MINUTA VAR. SILESIACA	319.07	218.59	425.81	322.49	105.66	2.45
CYRABELLA TUMIDA	.00	.00	32.06	11.02	19.09	.09
DIATOMA TENUE VAR. ELONGATUM	15.95	67.25	.00	27.74	35.14	.21
FRAGILARIA CAPUCINA	31.91	201.76	115.72	116.46	44.93	.99
FRAGILARIA CONSTRUENS VAR. VENETA	15.95	.00	.00	5.32	9.21	.04
FRAGILARIA CROTONENSIS	.00	16.81	.00	10.92	9.47	.08
FRAGILARIA VAUCHERIAE	127.63	33.63	.00	22.23	19.25	.17
GOMPHONEA ACUMINATUM	.00	94.07	33.06	131.19	48.98	1.00
GOMPHONEA ANGUSTATUM	638.14	.00	33.66	11.02	13.09	.32
GOMPHONEA OLIVACEUM	223.35	403.52	247.97	291.61	406.55	7.25
GOMPHONEA SUBCLAVATUM VAR. UPSALIEN	414.79	554.65	297.56	422.40	97.70	2.22
GOMPHONEA TRUNCATUM	.00	33.63	.00	11.21	128.81	3.21
NAVICULA AURICULATA	15.95	.00	.00	5.32	19.41	.09
NAVICULA CINCTA	15.95	50.44	.00	5.32	9.21	.04
NAVICULA CRYPTOCEPHALA	.00	50.44	.00	22.13	25.78	.17
NAVICULA CRYPTOCEPHALA VAR. VENETA	574.32	605.29	16.53	22.32	25.71	.17
NAVICULA ELGENSIS	15.95	.00	380.21	519.94	121.99	3.94
NAVICULA GPACILOIDES	15.95	.00	.00	5.32	9.21	.04
NAVICULA HALOPHILA	.00	.00	.00	5.32	9.21	.04
NAVICULA HEUFELERI	31.91	16.81	16.53	5.51	9.54	.04
NAVICULA LANCEOLATA	15.95	.00	264.50	104.41	133.85	.79
NAVICULA MENISCULUS VAR. UPSALIENSI	.00	.00	32.06	16.34	16.53	.12
NAVICULA NOTHA	111.67	50.44	33.06	11.02	19.09	.09
NAVICULA PUPILA	.00	.00	16.53	120.16	78.33	.91
NAVICULA RHYNCHOCEPHALA	95.72	168.14	16.53	5.51	3.54	.04
NAVICULA SECRETA VAR. APIICULATA	303.11	100.88	214.90	159.59	60.05	1.21
NAVICULA VIRIDULA VAR. AVENACEA	1627.25	1681.35	595.12	333.04	248.47	2.53
NITZSCHIA ACICULARIS	31.91	50.44	1653.10	1653.90	27.06	12.58
NITZSCHIA COMMUNIS	.00	44.07	16.53	32.96	14.99	.25
NITZSCHIA DISSIPATA	1547.48	1714.98	.00	24.02	4.54	.21
NITZSCHIA FRUSTULUM	717.90	1105.69	1438.20	1566.89	139.41	11.92
NITZSCHIA HOLSATICA	239.30	269.02	1091.05	972.66	221.01	7.40
			760.43	422.91	222.67	3.22

MITZSCHIA HUNGARICA	143.58	33.63	33.06	70.09	63.65	.53
MITZSCHIA IGNORATA	15.95	33.63	16.53	22.04	10.04	.17
MITZSCHIA LATENS	654.09	437.15	545.52	545.59	108.47	4.15
MITZSCHIA LINEARIS	47.86	33.63	46.59	43.69	9.76	.33
MITZSCHIA PALEA	701.95	1008.81	991.86	900.87	172.48	6.85
MITZSCHIA TETRASTOMELLA VAR. LEVIDENS	15.95	.00	.00	5.32	9.21	.04
MITZSCHIA SP.	255.25	.00	115.72	123.66	127.81	.94
PLEUROSIGMA DELICATISSIMA	15.95	.00	.00	5.32	9.21	.04
RHOICOSPHEMIA CURVATA	701.95	739.79	1124.11	855.29	231.58	6.51
RHOPALODIA GIBBERULA	.00	.00	33.06	11.02	14.09	.08
SUPIRELLA OVATA	15.95	.00	.00	5.32	9.21	.04
SYNEDRA ACUS	414.79	369.90	66.12	283.60	139.48	2.16
SYNEDRA FASCICULATA	159.53	117.69	.00	92.41	82.72	.70
SYNEDRA MINUSCULA	.00	16.81	16.53	11.11	9.63	.08
SYNEDRA PARASITICA	.00	100.68	.00	33.63	58.24	.26
SYNEDRA PULCHELLA VAR. LANCEOLATA	.00	.00	33.06	11.02	19.09	.08
SYNEDRA ULNA	.00	33.63	.00	11.21	13.41	.09
SYNEDRA ULNA VAR. OXYRHYNCHUS	127.63	100.88	198.37	142.29	50.37	1.08
THALASSIOSIRA FLUVIATILIS	.00	100.88	49.59	50.16	50.44	.38
DIVISION TOTAL	11231.20	14274.67	13435.73	12981.87	1572.55	93.77

CHLOROPHYTA

DRAPARNALDIA SP.	.00	215.47	215.47	143.64	124.40	1.09
DIVISION TOTAL	.00	215.47	215.47	143.64	124.40	1.09

CHRYSOPHYTA

OSCILLATORIA SP.	.00	53.87	.00	17.96	31.10	.14
DIVISION TOTAL	.00	53.87	.00	17.96	31.10	.14
TOTAL DENSITY	11231.20	14544.00	13655.20	13143.47	1714.66	100.00

DIVERSITY INDEX CALCULATIONS

SHANNON INDEX = 3.179
 VARIANCE = .0001
 MAXIMUM INDEX = 4.159
 EVENNESS = .764
 NO OF SPECIES = 64

STATION: 2 - MIDDLE STATION
 REPLICATES - 3
 SUBSTRATE - GLASS SLIDE

DENSITY (UNITS/MM²)

TAXON	REP 1	REP 2	REP 3	MEAN	S.D.	% RELATIVE ABUNDANCE
BACILLARIOPHYTA						
ACHNANTHES AFFINIS	.00	37.28	.00	12.43	21.52	.08
ACHNANTHES LANCEOLATA VAR. DUBIA	414.14	298.23	593.15	435.17	148.58	2.66
ACHNANTHES MICROCEPHALA	18.82	.00	.00	6.27	10.87	.04
ACHNANTHES MINUTISSIMA	602.38	1230.21	1031.56	954.72	323.89	6.27
AMPHILEURA PELLUCIDA	.00	37.28	.00	12.43	21.52	.08
AMPHORA OVALIS	18.82	.00	.00	6.27	10.87	.04
AMPHORA PERPUSILLA	.00	37.28	180.52	72.60	95.30	.48
COCconeis PEDICULUS	18.82	.00	25.79	14.87	13.34	.10
COCconeis PLACENTULA	282.37	1192.93	438.41	637.90	456.95	4.19
CYCLotella MENEGHINIANA	338.84	782.46	541.57	554.42	222.23	3.64
CYMATOPEURA ELLIPTICA	.00	.00	51.58	17.19	29.78	.11
CYMBELLA MINUTA VAR. SILESIACA	395.31	298.23	154.73	282.76	121.03	1.86
CYMBELLA SINUATA	18.82	74.56	25.79	39.72	30.37	.26
CYMBELLA TUMIDA	18.82	.00	25.79	14.87	13.34	.10
DIATOMA TENUE VAR. ELONGATUM	.00	37.28	77.37	39.22	38.69	.25
DIATOMA VULGARE	150.59	37.28	51.58	79.82	61.71	.52
FRAGILARIA CONSTRUENS VAR. VENETA	56.47	186.39	.00	80.95	95.58	.53
FRAGILARIA CROTONENSIS	602.38	186.39	1057.35	615.39	435.62	4.04
FRAGILARIA LEPTOSTAURON	56.47	186.39	25.79	89.55	85.26	.59
FRAGILARIA VAUCHERIAE	207.07	149.12	154.73	170.31	31.64	1.12
GOPHONEMA ANGSTATUM	470.61	762.86	541.57	598.35	163.63	3.93
GOPHONEMA INTRICATUM	18.82	.00	.00	6.27	10.87	.04
GOPHONEMA OLIVACEUM	414.14	186.39	1005.78	535.44	422.94	3.52
GOPHONEMA SIMUS	56.47	.00	.00	18.82	32.60	.12
GOPHONEMA SUBCLAVATUM	.00	149.12	.00	49.71	36.09	.33
GOPHONEMA SURCLAVATUM VAR. UPSALIEN	244.72	.00	180.52	141.75	126.88	.93
GYROSIGMA SPENCERII	.00	.00	25.79	8.60	16.89	.06
Hantzschia AMPHIOXY	.00	37.28	25.79	21.02	19.09	.14
NAVICULA CINCTA	.00	.00	25.79	8.60	16.89	.06
NAVICULA CRYPTOCEPHALA	.00	484.63	25.79	170.14	272.66	1.12
NAVICULA CRYPTOCEPHALA VAR. VENETA	941.22	3727.90	1934.18	2201.10	1412.33	14.46
NAVICULA ELGINENSIS	.00	37.28	25.79	21.02	19.09	.14
NAVICULA HEUFELERI	112.95	559.18	154.73	275.62	246.46	1.81
NAVICULA LANCEOLATA	18.82	74.56	25.79	39.72	30.37	.26
NAVICULA MISCULUS VAR. UPSALIENSIS	37.65	111.84	103.16	84.21	40.56	.55
NAVICULA MINIMA	.00	37.28	.00	12.43	21.52	.03
NAVICULA MUTICA VAR. UNDULATA	.00	37.28	.00	12.43	21.52	.03
NAVICULA NOTHA	75.30	410.07	.00	161.79	218.29	1.06
NAVICULA PUPULA	18.82	37.28	25.79	27.30	9.32	.19
NAVICULA PROTRACTA	.00	.00	25.79	8.60	16.89	.06
NAVICULA RHYNCHOCEPHALA	150.59	559.18	103.16	270.98	250.72	1.72
NAVICULA SECRETA VAR. APICULATA	1223.56	37.28	.00	420.29	695.92	2.75
NAVICULA TRIPUNCTATA VAR. SCHIZONEHO	.00	.00	103.16	34.39	59.56	.23
NAVICULA VIRIDULA VAR. AVENACEA	1901.26	2970.48	2604.70	2458.81	503.81	16.14
NEIDUM SP.	.00	.00	25.79	8.60	16.89	.06
NITZSCHIA ACICULARIS	18.82	.00	.00	6.27	10.87	.04
NITZSCHIA COMMUNIS	37.65	.00	.00	12.55	21.74	.03
NITZSCHIA GUSTIPATA	150.59	447.35	154.73	250.89	170.15	1.65
NITZSCHIA FRUSTULUM	451.78	335.51	606.31	446.53	136.14	3.25
NITZSCHIA HOLSATICA	37.65	.00	140.52	72.72	95.24	.44
NITZSCHIA HUNGARICA	18.82	.00	77.37	32.04	40.35	.21
NITZSCHIA IGNIPATA	.00	37.28	.00	12.43	21.52	.03
NITZSCHIA LATENS	527.08	149.12	1057.35	577.65	456.24	3.80

NITZSCHIA LINEARIS	112.95	74.56	51.58	79.69	31.00	.52
NITZSCHIA PALEA	244.77	260.95	206.31	237.33	28.06	1.56
NITZSCHIA TRYBLIOWELLA VAR. LEVIDENS	.00	.00	77.37	25.79	44.67	.17
NITZSCHIA SP.	18.92	.00	.00	5.27	10.87	.04
PLEUROSIGMA DELICATISSIMA	.00	.00	77.37	25.79	44.67	.17
RHIZOSIPHONIA CURVATA	658.85	596.46	954.20	736.50	191.09	4.84
SUFIURELLA OVALIS	.00	37.28	51.58	29.62	26.63	.19
SUKIRELLA OVATA	225.89	149.12	103.16	159.39	62.01	1.05
SYNEDRA AGLS	18.82	74.56	206.31	99.90	95.28	.66
SYNEDRA FASCICULATA	112.95	186.39	126.95	142.76	38.62	.94
SYNEDRA PARASITICA	.00	37.28	25.79	21.02	19.09	.14
SYNEDRA PULCHELLA VAR. LANCEOLATA	489.43	.00	160.52	223.32	247.51	1.47
SYNEDRA ULNA	56.47	74.56	.00	43.68	34.69	.29
SYNEDRA ULNA VAR. JXYRHYNCHUS	75.30	.00	126.95	68.08	64.77	.45
THALASSIOSIRA FLUVIATILIS	37.65	.00	26.79	21.15	19.25	.14
DIVISION TOTAL	12179.37	17372.00	15782.93	15111.43	2660.65	96.29

CHLOROPHYTA

GLADOPHORA GLOMERATA	.00	80.80	.00	26.93	46.65	.19
HYCRURUS SP.	242.40	.00	.00	90.80	139.95	.53
DIVISION TOTAL	242.40	80.80	.00	107.73	123.42	.71

TOTAL DENSITY	12421.77	17452.80	15782.93	15219.17	2562.46	100.00
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DIVERSITY INDEX CALCULATIONS

SHANNON INDEX = 3.232
 VARIANCE = .0001
 MAXIMUM INDEX = 4.248
 EVENNESS = .761
 NO OF SPECIES = 70

STATION: 3 - HUNTER STATION
 REPLICATES - 3
 SUBSTRATE - GLASS SLIDE

SAMPLE DATE - 102981

DENSITY (UNITS/MM2)

TAXON	REP 1	REP 2	REP 3	MEAN	S.D.	% RELATIVE ABUNDANCE
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BACILLARIOPHYTA

ACHNANTHES AFFINIS	50.09	.00	.00	16.70	28.92	.06
ACHNANTHES LANCEOLATA VAR. DUBIA	1202.24	512.54	3656.03	1790.29	1452.22	6.08
ACHNANTHES MICROCEPHALA	.00	.00	304.67	101.56	175.90	.14
ACHNANTHES MINUTISSIMA	5460.16	2861.68	10155.79	6159.21	3676.96	20.91
COCONEIS PLACENTULA	1502.80	384.41	3757.64	1881.61	1718.23	6.33
CYCLOTELLA MENECHMINIANA	400.75	512.54	812.46	575.25	212.60	1.95
DIATOMA VULGARE	50.09	.00	.00	16.70	23.92	.06
FRAGILARIA VAUCHERIAE	50.09	.00	.00	16.70	26.92	.06
GOPHPHONEMA ANGSTIATUM	2504.66	1452.20	3146.29	2360.39	856.22	8.34
GOPHPHONEMA OLIVACEUM	1252.35	1281.35	4366.99	2330.22	1739.93	7.61
GOPHPHONEMA SUBCLAVATUM	.00	128.14	203.12	110.42	.37	.37
GOPHPHONEMA SUBCLAVATUM VAR. UPSALIENSIS	100.19	.00	.00	33.40	57.84	.11
GYROSTOMA SPENCERII	100.19	.00	.00	33.40	57.84	.11
NAVICULA AFFINIS	.00	.00	203.12	67.71	117.27	.23
NAVICULA CAPITATA	150.28	.00	.00	50.09	56.76	.17
NAVICULA CINCTA	50.09	42.71	203.12	98.64	90.55	.33
NAVICULA CRYPTOCEPHALA VAR. VENETA	1953.63	2263.72	1216.69	1812.02	536.71	6.15
NAVICULA ELGINENSIS	.00	128.14	.00	42.71	73.98	.14
NAVICULA HEUFLERI	450.84	854.23	2335.83	1213.63	992.56	4.12
NAVICULA MENISCULUS VAR. UPSALIENSIS	50.09	.00	.00	16.70	28.92	.06
NAVICULA MINIMA	.00	128.14	.00	42.71	73.98	.14
NAVICULA MINUSCULA	.00	170.85	.00	56.95	98.64	.19
NAVICULA NOTHA	100.19	42.71	.00	175.77	223.36	.60
NAVICULA PELLICULOSA	.00	42.71	.00	14.24	24.66	.05
NAVICULA SECRETA VAR. APICULATA	450.84	.00	.00	150.28	260.29	.51
NAVICULA TRIPUNCTATA VAR. SCHIZONEMO	1502.80	256.27	.00	586.36	903.94	1.99
NAVICULA VIRIDULA VAR. AVENACEA	1107.05	170.85	812.46	695.12	476.54	2.36
NITZSCHIA ACICULARIS	250.47	.00	.00	83.49	144.61	.23
NITZSCHIA COMMUNIS	100.19	85.42	.00	61.87	54.09	.21
NITZSCHIA DENTICULA	100.19	.00	.00	33.40	57.84	.11
NITZSCHIA OJSSIPATA	551.02	982.37	.00	511.13	492.40	1.74
NITZSCHIA FRUSTULUM	5209.69	4698.29	914.02	3607.33	2344.45	12.25
NITZSCHIA HOLSATICA	500.93	555.25	.00	352.06	306.10	1.20
NITZSCHIA HUNGARICA	701.30	982.37	1015.58	899.75	172.66	3.05
NITZSCHIA LATENS	200.37	42.71	.00	81.03	135.54	.28
NITZSCHIA LINEARIS	.00	128.14	.00	42.71	73.98	.14
NITZSCHIA PALEA	751.40	1494.91	2132.72	1459.67	631.33	4.96
NITZSCHIA TRYBLIONELLA VAR. LEVIDENS	100.19	.00	.00	33.40	57.84	.11
NITZSCHIA SP.	.00	384.41	.00	128.14	221.94	.43
RHIZOSPHERIA CURVATA	250.47	.00	203.12	151.19	133.06	.51
RHOPALODIA MUSCULUS	50.09	.00	.00	16.70	28.92	.06
SURIPELLA OVATA	701.30	1324.06	812.46	945.94	332.14	3.21
SYNEDRA ACUS	100.19	42.71	.00	47.63	50.27	.16
SYNEDRA FASCICULATA	100.19	42.71	.00	81.49	33.56	.28
SYNEDRA ULNA	150.28	.00	203.12	117.80	105.38	.40
THALASSIOSIRA FLUVIATILIS	300.56	85.42	101.56	162.51	119.82	.55
DIVISION TOTAL	28603.20	22466.35	36662.40	29243.98	7110.69	99.27

CHLOROPHYTA

MICROSPORA SP.	.00	.00	53.60	17.87	30.95	.06
PALPILLA STAGE OF CHAETOPHORACEAE	53.87	.00	536.00	196.62	255.14	.67
DIVISION TOTAL	53.87	.00	589.60	214.49	325.97	.73
TOTAL DENSITY	26657.07	22466.35	37252.00	29458.47	7425.33	100.00

DIVERSITY INDEX CALCULATIONS

SHANNON INDEX = 2.617
 VARIANCE = .0000
 MAXIMUM INDEX = 3.371
 EVENNESS = .723
 NO OF SPECIES = 48

2.5.3 Terrestrial Vegetation Studies

Vegetation data collection was conducted in Summer 1981; the following tables show the results of this study.

Table 2.5.3-1

Herb quadrat summaries for Plot 1-0. Based on data from 25 permanently located quadrats. June 1981. Values in percent. "?" indicates uncertain identification. \pm values are equal to the standard error of the mean.

Species	Mean Cover (%)	Relative Cover (%)	Range of Cover Values	Frequency (%)
<u>HERBACEOUS SPECIES</u>				
<i>Agoseris glauca</i>	< 0.1	< 0.01	0- <1	4.0
<i>Agropyron desertorum</i>	3.2	30.53	0- 17	40.0
<i>Agropyron smithii</i>	0.6	5.73	0- 9	12.0
<i>Agropyron trachycaulum</i>	0.5	4.77	0- 6	16.0
<i>Antennaria rosea</i>	0.8	7.63	0- 10	20.0
<i>Arabis holboellii</i>	< 0.1	0.38	0- 1	20.0
<i>Artemisia ludoviciana</i>	0.2	1.91	0- 2	12.0
<i>Aster fendleri</i> ?	< 0.1	< 0.01	0- <1	4.0
<i>Astragalus ceramicus</i>	< 0.1	< 0.01	0- <1	8.0
<i>Astragalus diversifolius</i>	< 0.1	< 0.01	0- <1	4.0
<i>Bouteloua gracilis</i>	0.2	1.91	0- 6	4.0
<i>Bromus tectorum</i>	0.7	6.68	0- 4	84.0
<i>Carex rossii</i>	0.2	1.91	0- 4	28.0
<i>Carex</i> sp.	< 0.1	< 0.01	0- <1	4.0
<i>Chaenactis douglasii</i>	< 0.1	< 0.01	0- <1	8.0
<i>Chenopodium album</i>	< 0.1	< 0.01	0- <1	12.0
<i>Collinsia parviflora</i>	< 0.1	< 0.01	0- <1	4.0
<i>Cryptantha</i> sp.	< 0.1	< 0.01	0- <1	8.0
<i>Descurainia pinnata</i>	< 0.1	< 0.01	0- <1	4.0
<i>Gayophytum ramosissimum</i>	< 0.1	< 0.01	0- <1	12.0
<i>Lomatium orientale</i>	< 0.1	< 0.01	0- <1	8.0
<i>Lupinus argenteus</i>	< 0.1	0.38	0- 1	4.0
<i>Mentzelia dispersa</i>	< 0.1	< 0.01	0- <1	8.0
<i>Oryzopsis hymenoides</i>	1.9	18.13	0- 15	64.0
<i>Phlox longifolia</i>	< 0.1	< 0.01	0- <1	8.0
<i>Poa fendleriana</i>	0.1	0.95	0- 2	8.0
<i>Polygonum sawatchense</i>	< 0.1	< 0.01	0- <1	12.0
<i>Sitanion longifolium</i>	0.2	1.91	0- 1	32.0
<i>Stipa comata</i>	0.4	3.82	0- 5	16.0
<i>Townsendia sericea</i>	< 0.1	< 0.01	0- <1	4.0
Sub-Total	9.0			

Table 1.

(contd.) Herb quadrat summaries for Plot 1-0.

Species	Mean Cover (%)	Relative Cover (%)	Range of Cover Values	Frequency (%)
<u>WOODY SPECIES</u>				
<i>Amelanchier</i> spp.	< 0.1	< 0.01	0- <1	4.0
<i>Artemisia tridentata</i>	< 0.1	< 0.01	0- <1	20.0
<i>Gutierrezia sarothrae</i>	0.1	0.95	0- 2	8.0
<i>Pinus edulis</i>	< 0.1	< 0.01	0- <1	4.0
<i>Purshia tridentata</i>	1.0	9.54	0- 6	32.0
<i>Symphoricarpos oreophilus</i>	0.3	2.86	0- 7	4.0
Sub-Total	1.4			
Shrub Layer Cover	17.4		0- 75	
Total Herb Cover	8.4		< 1- 22	
Total Woody in Herb Layer	1.4		0- 7	
Mosses	0.4		0- 3	
Crustose Lichen	0.6		0- 8	
Litter	75.8		10-100	
Bare Soil	20.1		0- 87	
Rock	3.2		0- 26	
	<u>Mean</u> \pm <u>S.E.</u>		<u>Range</u>	
No. of Herb Species/m ²	4.72 \pm 0.43		2-10	
Total No. Species/m ²	5.16 \pm 0.48		2-11	

Table 2.5.3-2

Herb quadrat summaries for Plot 1-F. Based on data from 25 permanently located quadrats. June 1981. Values in percent. "?" indicates uncertain identification. \pm values are equal to the standard error of the mean.

Species	Mean Cover (%)	Relative Cover (%)	Range of Cover Values	Frequency (%)
<u>HERBACEOUS SPECIES</u>				
<i>Agropyron dasystachyum</i>	3.3	23.08	0- 24	48.0
<i>Agropyron desertorum</i>	<0.1	0.28	0- 1	4.0
<i>Agropyron smithii</i>	0.4	2.80	0- 7	16.0
<i>Antennaria parvifolia</i>	<0.1	0.28	0- 1	8.0
<i>Antennaria rosea</i>	0.2	1.40	0- 2	12.0
<i>Arabis holboellii</i>	<0.1	<0.01	0- <1	12.0
<i>Artemisia ludoviciana</i>	<0.1	<0.01	0- <1	4.0
<i>Aster fendleri</i> ?	<0.1	<0.01	0- <1	4.0
<i>Astragalus ceramicus</i>	<0.1	<0.01	0- <1	12.0
<i>Bromus tectorum</i>	0.9	6.29	0- 12	60.0
<i>Carex rossii</i>	0.4	2.80	0- 6	28.0
<i>Castilleja chromosa</i>	<0.1	0.28	0- 1	4.0
<i>Chenopodium album</i>	<0.1	<0.01	0- <1	12.0
<i>Collinsia parviflora</i>	<0.1	<0.01	0- <1	8.0
<i>Cryptantha</i> sp.	<0.1	<0.01	0- <1	8.0
<i>Descurainia pinnata</i>	<0.1	<0.01	0- <1	8.0
<i>Erigeron pumillus</i>	<0.1	<0.01	0- <1	4.0
<i>Gayophytum ramosissimum</i>	<0.1	<0.01	0- <1	4.0
<i>Haplopappus nuttallii</i>	0.2	1.40	0- 2	12.0
<i>Koeleria gracilis</i>	0.7	4.90	0- 9	28.0
<i>Lappula redowskii</i>	<0.1	<0.01	0- <1	4.0
<i>Mentzelia dispersa</i>	<0.1	<0.01	0- <1	4.0
<i>Oryzopsis hymenoides</i>	4.5	31.47	0- 23	72.0
<i>Phlox hoodii</i>	1.0	6.99	0- 6	32.0
<i>Physaria floribunda</i>	<0.1	<0.01	0- <1	4.0
<i>Poa</i> sp.	<0.1	<0.01	0- <1	4.0
<i>Poa fendleriana</i>	2.0	13.99	0- 14	40.0
<i>Senecio multilobatus</i>	<0.1	<0.01	0- <1	8.0
<i>Sitanion longifolium</i>	0.2	1.40	0- 2	24.0
<i>Stipa comata</i>	<0.1	0.28	0- 1	4.0
<i>Zygadenus venenosus</i>	<0.1	<0.01	0- <1	8.0
Sub-Total	13.8			

Table 2.

(contd.) Herb quadrat summaries for Plot 1-F.

Species	Mean Cover (%)	Relative Cover (%)	Range of Cover Values	Frequency (%)
<u>WOODY SPECIES</u>				
<i>Artemisia tridentata</i>	0.2	1.40	0- 3	36.0
<i>Chrysothamnus nauseosus</i>	< 0.1	0.28	0- 1	4.0
<i>Gutierrezia sarothrae</i>	0.1	0.70	0- 1	24.0
<i>Pinus edulis</i>	< 0.1	< 0.01	0- < 1	44.0
Sub-Total	14.1			
Shrub Layer Cover	5.8		0- 35	
Total Herb Cover	12.9		1- 27	
Total Woody in Herb Layer	0.3		0- 3	
Mosses	< 0.1		0- < 1	
Crustose Lichen	0.2		0- 5	
Foliose-Fruticose Lichen	< 0.1		0- < 1	
Litter	81.1		45-100	
Bare Soil	16.3		4- 55	
Rock	2.4		0- 5	
	<u>Mean</u> \pm <u>S.E.</u>		<u>Range</u>	
No. Herb Species/m ²	4.92 \pm 0.57		1-11	
Total No. Species/m ²	5.60 \pm 0.70		1-12	

Table 2.5.3-3

Herb quadrat summaries for Plot 2-0. Based on data from 25 permanently located quadrats. June 1981. Values in percent. "?" indicated uncertain identification. \pm values are equal to the standard error of the mean.

Species	Mean Cover (%)	Relative Cover (%)	Range of Cover Values	Frequency (%)
<u>HERBACEOUS SPECIES</u>				
<i>Agoseris glauca</i>	< 0.1	< 0.01	0- < 1	4.0
<i>Agropyron desertorum</i>	1.6	21.86	0- 7	44.0
<i>Agropyron smithii</i>	0.4	5.46	0- 11	20.0
<i>Antennaria rosea</i>	< 0.1	< 0.01	0- < 1	4.0
<i>Arabis holboellii</i>	< 0.1	< 0.01	0- < 1	8.0
<i>Artemisia ludoviciana</i>	< 0.1	0.55	0- 1	4.0
<i>Aster fendleri</i>	< 0.1	0.55	0- 1	20.0
<i>Aster glaucodes</i> ?	< 0.1	< 0.01	0- < 1	4.0
<i>Astragalus ceramicus</i>	< 0.1	< 0.01	0- < 1	4.0
<i>Bouteloua gracilis</i>	0.3	4.10	0- 7	8.0
<i>Bromus tectorum</i>	1.9	25.96	0- 15	96.0
<i>Carex rossii</i>	0.2	2.73	0- 5	8.0
<i>Chenopodium album</i>	< 0.1	< 0.01	0- < 1	40.0
<i>Descurainia pinnata</i>	< 0.1	< 0.01	0- < 1	8.0
<i>Eriogonum umbellatum</i>	< 0.1	< 0.01	0- < 1	4.0
<i>Gayophytum ramosissimum</i>	< 0.1	< 0.01	0- < 1	20.0
<i>Heterotheca villosa</i>	1.1	15.03	0- 27	4.0
<i>Koeleria gracilis</i>	< 0.1	0.55	0- 1	4.0
<i>Lappula redowskii</i>	< 0.1	< 0.01	0- < 1	12.0
<i>Oryzopsis hymenoides</i>	< 0.1	< 0.01	0- < 1	16.0
<i>Phlox longifolia</i>	< 0.1	< 0.01	0- < 1	12.0
<i>Poa pratensis</i>	0.2	2.73	0- 4	4.0
<i>Poa</i> sp.	0.2	2.73	0- 3	12.0
<i>Polygonum sawatchense</i>	< 0.1	< 0.01	0- < 1	4.0
<i>Sitanion longifolium</i>	0.2	2.73	0- 1	36.0
<i>Sphaeralcea coccinea</i>	0.1	1.37	0- 2	4.0
Unknown Composite	0.6	8.20	0- 15	4.0
Sub-Total	6.8			
<u>WOODY SPECIES</u>				
<i>Artemisia tridentata</i>	0.2	2.73	0- 2	44.0
<i>Chrysothamnus nauseosus</i>	0.1	1.37	0- 1	12.0
<i>Opuntia polyacantha</i>	0.1	1.37	0- 2	4.0
Sub-Total	0.4			

Table 3. (contd.) Herb quadrat summaries for Plot 2-0.

Species	Mean Cover (%)	Relative Cover (%)	Range of Cover Values	Frequency (%)
Shrub Layer Cover	10.9		0- 40	
Total Herb Cover	6.6		< 1- 27	
Total Woody in Herb Layer	0.4		0- 3	
Mosses	0.1		0- 3	
Crustose Lichen	0.1		0- 1	
Foliose-Fruticose Lichen	0		---	
Litter	81.8		56-100	
Bare Soil	16.0		0- 38	
Rock	2.0		0- 28	
	<u>Mean</u> \pm <u>S.E.</u>		<u>Range</u>	
No. of Herb Species/m ²	4.08 \pm 0.35		1- 7	
Total No. Species/m ²	4.64 \pm 0.42		1- 8	

Table 2.5.3-4

Herb quadrat summaries for Plot 2-F. Based on data from 25 permanently located quadrats. June 1981. Values in percent. \pm values are equal to the standard error of the mean.

Species	Mean Cover (%)	Relative Cover (%)	Range of Cover Values	Frequency (%)
<u>HERBACEOUS SPECIES</u>				
<i>Agoseris glauca</i>	< 0.1	< 0.01	0- < 1	4.0
<i>Agropyron dasystachyum</i>	0.8	10.55	0- 15	16.0
<i>Agropyron desertorum</i>	4.2	55.41	0- 21	48.0
<i>Agropyron smithii</i>	0.1	1.32	0- 1	16.0
<i>Antennaria rosea</i>	0.2	2.64	0- 3	8.0
<i>Arabis holboellii</i>	< 0.1	< 0.01	0- < 1	4.0
<i>Aster fendleri</i>	< 0.1	< 0.01	0- < 1	8.0
<i>Bouteloua gracilis</i>	0.1	1.32	0- 1	12.0
<i>Bromus tectorum</i>	0.3	3.96	0- 3	60.0
<i>Chaenactis douglasii</i>	0.1	1.32	0- 2	4.0
<i>Chenopodium album</i>	< 0.1	< 0.01	0- < 1	24.0
<i>Festuca idahoensis</i>	0.1	1.32	0- 3	8.0
<i>Gayophytum ramosissimum</i>	< 0.1	< 0.01	0- < 1	20.0
<i>Koeleria gracilis</i>	0.3	3.96	0- 4	16.0
<i>Lomatium foeniculaceum</i>	0.1	1.32	0- 1	4.0
<i>Mentzelia dispersa</i>	< 0.1	< 0.01	0- < 1	8.0
<i>Phlox longifolia</i>	< 0.1	< 0.01	0- < 1	8.0
<i>Poa pratensis</i>	0.2	2.64	0- 4	4.0
<i>Poa</i> sp.	0.1	1.32	0- 3	4.0
<i>Oryzopsis hymenoides</i>	0.4	5.28	0- 3	32.0
<i>Senecio multilobatus</i>	< 0.1	< 0.01	0- < 1	4.0
<i>Sisymbrium longifolia</i>	< 0.1	< 0.01	0- < 1	4.0
<i>Sitanion longifolium</i>	0.2	2.64	0- 4	24.0
<i>Sphaeralcea coccinea</i>	0.1	1.32	0- 1	8.0
<i>Stipa comata</i>	0.1	1.32	0- 2	4.0
Sub-Total	7.4			
<u>WOODY SPECIES</u>				
<i>Artemisia tridentata</i>	< 0.1	0.53	0- 1	24.0
<i>Cercocarpus montanus</i>	< 0.1	< 0.01	0- < 1	4.0
<i>Chrysothamnus nauseosus</i>	< 0.1	0.53	0- 1	8.0
<i>Pinus edulis</i>	0.1	1.32	0- 2	4.0
<i>Purshia tridentata</i>	< 0.1	< 0.01	0- < 1	4.0
Sub-Total	0.1			

Table 4. (contd.) Herb quadrat summaries for Plot 2-F.

Species	Mean Cover (%)	Relative Cover (%)	Range of Cover Values	Frequency (%)
Shrub Layer Cover	16.3		0- 75	
Total Herb Cover	7.0		0- 23	
Total Woody in Herb Layer	0.2		0- 2	
Mosses	0.4		0- 5	
Crustose Lichen	0.7		0- 8	
Foliose-Fruticose Lichens	0.0		---	
Litter	80.0		34-100	
Bare Soil	16.9		0- 65	
Rock	2.1		0- 23	
	<u>Mean ± S.E.</u>		<u>Range</u>	
No. of Herb Species/m ²	3.52 ± 0.36		0- 7	
Total No. Species/m ²	3.96 ± 0.37		1- 7	

Table 2.5.3-5

Mean cover, relative cover, frequency, and density for shrub species in plot 1-0. 1981 data. Height Class I = 0.25-0.75m; Class II = 0.76-1.50m; Class III = 1.51-2.25m; Class IV = >2.25m. Values based on data from 20 10mx4m line-strip transects.

	Height Class	Mean Cover (%)	Relative Cover (%)	Frequency (%)	Density (No. of Individuals/ha)
<i>Amelanchier</i> spp.	Total	0.7	3.38	45.0	263
	I				138
	II				113
	III				13
<i>Artemisia tridentata</i>	Total	13.6	65.70	100.0	4,075
	I				2,038
	II				1,875
	III				163
<i>Cercocarpus montanus</i>	Total	0.3	1.45	70.0	513
	I				275
	II				213
	III				25
<i>Chrysothamnus nauseosus</i>	Total	0.2	0.97	35.0	175
	I				138
	II				38
<i>Chrysothamnus viscidiflorus</i>	Total	0.4	1.93	25.0	125
	I				125

Table 5. (contd.) Mean cover, relative cover, frequency, and density for shrub species in plot 1-0.

	Height Class	Mean Cover (%)	Relative Cover (%)	Frequency (%)	Density (No. of Individuals/ha)
<i>Juniperus osteosperma</i>	Total	0.8	3.86	40.0	125
	I				50
	II III				50 25
<i>Juniperus scopulorum</i>	Total	1.4	6.76	20.0	175
	I				38
	II III				88 50
<i>Opuntia polyacantha</i>	Total	<0.1	<0.01	25.0	113
	I				113
<i>Pinus edulis</i>	Total	0.9	4.35	75.0	388
	I				113
	II				163
	III IV				100 13
<i>Purshia tridentata</i>	Total	2.0	9.66	75.0	1,175
	I II				1,063 113
<i>Symphoricarpos oreophilus</i>	Total	0.4	1.93	40.0	375
	I II				363 13
TOTAL		20.7			7,502

Table 2.5.3-6

Mean cover, relative cover, frequency, and density for shrub species in plot 1-F. 1981 data.
 Height Class I = 0.25-0.75m; Class II = 0.76-1.50m; Class III = 1.51-2.25m; Class IV = >2.25m.
 Values based on data from 20 10mx4m line-strip transects.

	Height Class	Mean Cover (%)	Relative Cover (%)	Frequency (%)	Density (No. of Individuals/ha)
<i>Amelanchier</i> spp.	Total	0.9	7.23	20.0	113
	I				63
	II				38
	III				13
<i>Artemisia tridentata</i>	Total	7.9	63.50	100.0	2,550
	I				1,225
	II				1,125
	III				200
<i>Cercocarpus montanus</i>	Total	0.2	1.61	50.0	288
	I				50
	II				138
	III				100
<i>Chrysothamnus nauseosus</i>	Total	0.6	4.82	35.0	175
	I				125
	II				50
<i>Chrysothamnus viscidiflorus</i>	Total	0.5	4.02	25.0	150
	I				150
	II				
<i>Juniperus osteosperma</i>	Total	0.2	1.61	30.0	125
	I				75
	II				25
	III				25

Table 6. (contd.) Mean cover, relative cover, frequency, and density for shrub species in plot 1-F.

	Height Class	Mean Cover (%)	Relative Cover (%)	Frequency (%)	Density (No. of Individuals/ha)
<i>Juniperus scopulorum</i>	Total	0.2	1.61	10.0	25
	I II				25
<i>Opuntia polyacantha</i>	Total	< 0.1	< 0.01	15.0	50
	I				50
<i>Pinus edulis</i>	Total	< 0.1	0.32	30.0	188
	I				125
	II				38
	III				25
<i>Purshia tridentata</i>	Total	1.8	14.47	60.0	438
	I				275
	II				125
	III				25
	IV				13
<i>Symphoricarpos oreophilus</i>	Total	0.1	0.80	35.0	238
	I II				200 38
TOTAL		12.4			4,340

Table 2.5.3-7

Mean cover, relative cover, frequency, and density for shrub species in plot 2-0. 1981 data. Height Class I = 0.25-0.75m; Class II = 0.76-1.50m; Class III = 1.51-2.25m; Class IV = >2.25m. Values based on data from 20 10mx4m line-strip transects.

	Height Class	Mean Cover (%)	Relative Cover (%)	Frequency (%)	Density (No. of Individuals/ha)
<i>Amelanchier</i> spp.	Total	0.6	5.41	10.0	50
	I				38
	II				13
	III				
<i>Artemisia tridentata</i>	Total	3.1	27.93	90.0	1,663
	I				1,250
	II				300
	III				113
<i>Cercocarpus montanus</i>	Total	0.3	2.70	25.0	100
	I				50
	II				38
	III				13
<i>Chrysothamnus nauseosus</i>	Total	3.3	29.73	95.0	1,675
	I				1,450
	II				213
	III				13
<i>Chrysothamnus viscidiflorus</i>	Total	1.0	9.01	55.0	275
	I				
<i>Juniperus osteosperma</i>	Total	1.3	11.71	55.0	188
	I				100
	II				88
	III				

Table 7. (contd.) Mean cover, relative cover, frequency, and density for shrub species in plot 2-0.

	Height Class	Mean Cover (%)	Relative Cover (%)	Frequency (%)	Density (No. of Individuals/ha)
<i>Opuntia polyacantha</i>	Total I	< 0.1	< 0.01	20.0	88
<i>Pinus edulis</i>	Total I II III IV	0.6	5.41	65.0	288 63 75 125 25
<i>Purshia tridentata</i>	Total I II	0.6	5.41	25.0	138 100 38
<i>Symphoricarpos oreophilus</i>	Total I II	0.3	2.70	25.0	200 188 13
TOTAL		11.1			4,665

Table 2.5.3-8

Mean cover, relative cover, frequency, and density for shrub species in plot 2-F. 1981 data. Height Class I = 0.25-0.75m; Class II = 0.76-1.50m; Class III = 1.51-2.25m; Class IV = >2.25m. Values based on data from 20 10mx4m line-strip transects.

	Height Class	Mean Cover (%)	Relative Cover (%)	Frequency (%)	Density (No. of Individuals/ha)
<i>Amelanchier</i> spp.	Total	<0.1	<0.01	10.0	38
	I				13
	II				25
<i>Artemisia tridentata</i>	Total	3.4	21.99	85.0	2,125
	I				1,488
	II				513
	III				125
<i>Cercocarpus montanus</i>	Total	<0.1	0.13	15.0	100
	I				75
	II				13
	III				13
	IV				
<i>Chrysothamnus nauseosus</i>	Total	0.8	5.17	75.0	450
	I				263
	II				188
<i>Chrysothamnus viscidiflorus</i>	Total	0.2	1.29	30.0	88
	I				75
	II				13
<i>Juniperus osteosperma</i>	Total	5.3	34.28	70.0	350
	I				75
	II				150
	III				100
	IV				25

Table 8. (contd.) Mean cover, relative cover, frequency, and density for shrub species in plot 2-F.

	Height Class	Mean Cover (%)	Relative Cover (%)	Frequency (%)	Density (No. of Individuals/ha)
<i>Juniperus scopulorum</i>	Total I	<0.1	<0.01	5.0	13
<i>Opuntia polyacantha</i>	Total I	<0.1	0.26	25.0	113
<i>Pinus edulis</i>	Total I II III IV	1.4	9.06	70.0	413
					150 113 113 38
<i>Purshia tridentata</i>	Total I II III	4.2	27.17	45.0	538
					238 275 25
<i>Symphoricarpos oreophilus</i>	Total I II	0.1	0.65	30.0	263
					138 125
TOTAL		15.4			4,491

Table 2.5.3-9

Herb quadrat summaries for the Irrigation Study Plot.
Based on data from 25 permanently located quadrats (Sprinkler head #1)
June 1981. Values in percent. "?" indicates uncertain
identification. \pm values are equal to the standard error
of the mean.

Species	Mean Cover (%)	Relative Cover (%)	Range of Cover Values	Frequency (%)
<u>HERBACEOUS SPECIES</u>				
<i>Agoseris glauca</i>	<0.1	0.24	0- 1	32.0
<i>Agropyron dasystachyum</i>	0.5	3.02	0- 5	16.0
<i>Agropyron desertorum</i>	0.6	3.63	0- 7	20.0
<i>Agropyron smithii</i>	2.2	13.30	0- 12	48.0
<i>Agropyron trachycaulum</i>	2.0	12.09	0- 15	32.0
<i>Antennaria parviflora</i>	<0.1	0.24	0- 1	4.0
<i>Antennaria rosea</i>	0.6	3.63	0- 7	36.0
<i>Arabis holboellii</i>	<0.1	<0.01	0- <1	4.0
<i>Aster fendleri</i>	<0.1	0.24	0- 1	8.0
<i>Astragalus ceramicus</i>	<0.1	<0.01	0- <1	8.0
<i>Bouteloua gracilis</i>	<0.1	<0.01	0- <1	4.0
<i>Bromus tectorum</i>	2.1	12.70	< 1- 15	100.0
<i>Carex</i> spp.	<0.1	<0.01	0- <1	4.0
<i>Chaenactis douglasii</i>	<0.1	0.24	0- 1	24.0
<i>Chenopodium album</i>	<0.1	0.24	0- 1	12.0
<i>Collinsia parviflora</i>	<0.1	<0.01	0- <1	4.0
<i>Crepis acuminata</i>	0.1	0.60	0- 1	8.0
<i>Cryptantha</i> spp.	0.1	0.60	0- 1	12.0
<i>Descurainia pinnata</i>	<0.1	<0.01	0- <1	12.0
<i>Erysimum asperum</i>	0.1	0.60	0- 1	32.0
<i>Gayophytum ramosissimum</i>	<0.1	<0.01	0- <1	4.0
<i>Gilia aggregata</i>	<0.1	<0.01	0- <1	4.0
<i>Haplopappus nuttallii</i>	<0.1	<0.01	0- <1	4.0
<i>Heterotheca villosa</i>	0.6	3.63	0- 3	40.0
<i>Koeleria gracilis</i>	0.7	4.23	0- 4	48.0
<i>Mentzelia dispersa</i>	<0.1	<0.01	0- <1	8.0
<i>Oryzopsis hymenoides</i>	2.4	14.51	0- 18	40.0
<i>Penstemon caespitosus</i>	0.2	1.21	0- 2	12.0
<i>Penstemon fremontii</i> ?	<0.1	<0.01	0- <1	4.0
<i>Phlox hoodii</i>	0.5	3.02	0- 5	36.0
<i>Phlox longifolia</i>	0.1	0.60	0- 1	32.0
<i>Physaria floribunda</i>	0.1	0.60	0- 1	28.0
<i>Poa fendleriana</i> ?	1.3	7.86	0- 10	28.0
<i>Polygonum sawatchense</i>	<0.1	<0.01	0- <1	16.0
<i>Salsola iberica</i>	<0.1	<0.01	0- <1	8.0
<i>Senecio</i> spp.	<0.1	<0.01	0- <1	4.0

Table 9. (contd.) Herb quadrat summaries for the Irrigation Study Plot.
(Sprinkler head #44)

Species	Mean Cover (%)	Relative Cover (%)	Range of Cover Values	Frequency (%)
<u>HERBACEOUS SPECIES (contd.)</u>				
<i>Sitanion longifolium</i>	0.8	4.84	0- 4	40.0
<i>Stipa comata</i>	0.1	0.60	0- 3	4.0
<i>Sphaeralcea coccinea</i>	0.6	3.63	0- 7	20.0
<i>Taraxacum officinale</i>	0.1	0.60	0- 3	16.0
Sub-Total	15.8			
<u>WOODY SPECIES</u>				
<i>Artemisia tridentata</i>	0.3	1.81	0- 5	52.0
<i>Chrysothamnus viscidiflorus</i>	<0.1	0.24	0- 1	4.0
<i>Gutierrezia sarothrae</i>	0.2	1.21	0- 3	24.0
Sub-Total	0.5			
Total Shrub Layer Cover	9.8		0- 45	
Total Herb Cover	14.4		1- 26	
Total Woody in Herb Layer	0.6		0- 5	
Mosses	0.2		0- 3	
Crustose Lichens	0.4		0- 3	
Litter	84.2		46-100	
Bare Soil	12.5		0- 36	
Rock	3.1		0- 25	
	<u>Mean ± S.E.</u>		<u>Range</u>	
No. of Herb Species/m ²	8.16 ± 0.65		2-16	
Total No. Species/m ²	8.96 ± 0.72		2-17	

Table 2.5.3-10 Mean cover, relative cover, frequency, and density for shrub species in the Irrigation intensive study plot. 1981 data. Height Class I = 0.25m-0.75m; Class II = 0.76-1.50m; Class III = 1.51-2.25m; Class IV = > 2.25m. Values based on data from 20 10mx4m line strip transects.

	Height Class	Mean Cover (%)	Relative Cover (%)	Frequency (%)	Density (No. of Individuals/ha)	
<i>Amelanchier</i> spp.	Total	<0.1	<0.01	5.0	13	13
	I					
<i>Artemisia tridentata</i>	Total	2.8	19.86	90.0		1,288
	I				798	
	II				508	
	III				3	
<i>Chrysothamnus nauseosus</i>	Total	<0.1	<0.01	35.0		125
	I				88	
	II				38	
<i>Chrysothamnus viscidiflorus</i>	Total	0.7	4.96	70.0		563
	I				550	
	II				13	
<i>Juniperus osteosperma</i>	Total	2.3	16.31	80.0		500
	I				113	
	II				250	
	III				113	
	IV				25	
<i>Juniperus scopulorum</i>	Total	<0.1	<0.01	10.0		38
	I				25	
	II				13	

Table 10. (contd.) Mean cover, relative cover, frequency, and density for shrub species in the Irrigation intensive study plot.

	Height Class	Mean Cover (%)	Relative Cover (%)	Frequency (%)	Density (No. of Individuals/ha)	
<i>Opuntia polyacantha</i>	Total I	< 0.1	< 0.01	30.0	163	163
<i>Pinus edulis</i>	Total I II III	0.8	5.67	70.0	125 125 75	325
<i>Purshia tridentata</i>	Total I II	0.9	6.38	20.0	250 13	263
<i>Ribes</i> spp.	Total I II	< 0.1	< 0.01	5.0	25	25
<i>Symphoricarpos oreophilus</i>	Total I II	6.6	46.81	35.0	263 200	463
TOTAL		14.1				3,766

Table 2.5.3-11

Fresh weight estimates (grams) for intensive study plot BJ21 (1-F), chained pinyon-juniper range-land. July 1981

Quadrat Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
<i>Agropyron smithii</i>	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
					9								15		1				4	8		5			
<i>Bromus tectorum</i>	3		<1	<1	<1		<1	2		5	2	<1	<1	<1	4		<1	<1	1	<1	4	<1	1	<1	1
<i>Oryzopsis hymenoides</i>	4	17		6	16	3		7	3	9	13				15	48		19	9	8		27		4	19
	8	18		15	1	3	23		20		3			1	6	9		14			10	18	39	2	17
Perennial Grasses	3	58	111	23	5	27	54	18	2	64	11	65	78	72	6	3	44	29	5	11	3	12	10	52	3
	2	21	19	10	2	1	4	48	108	5	41	76	8	35	36	14	12	34	41	46	51	24	3	3	6
Annual Grasses																									
Perennial Forbs	5		2	1	5	2	<1		1	7	8		1		1	6	4			9	4	8		18	11
										3	2	22						1	<1	14	4		1		
Annual Forbs						<1			<1				<1						<1						
Half Shrubs					3						7									4					
					10																				
Total Biomass	7	83	111	29	24	30	54	18	12	74	40	80	79	72	22	61	48	48	14	37	15	47	10	74	33
	10	39	21	26	27	6	28	48	108	28	43	101	23	36	42	24	12	49	42	46	79	51	44	5	24

Table 2.5.3-12

Fresh weight estimates (grams) for intensive study plot BJ22 (2-F), chained pinyon-juniper range-land. July 1981

Quadrat Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	
<i>Agropyron smithii</i>	22	22	1	2	3	3		3	23		4	25	15	10	10	22			6		19	3	4		
<i>Bromus tectorum</i>	2	2	3	<1	28	7	28	<1	<1	1	1	14	22	1	1	1	1	5	1	1	5	1	<1	<1	
26	8	1	2	<1	2	4	<1	<1	<1	<1	<1	2	1	2	6	<1	2	11	18	1	<1	1	1	3	
<i>Oryzopsis hymenoides</i>			19		20	58		1	1		14	2	1	52							1			5	
13						15									3										
Perennial Grasses	13	27	41	1			11	1		1	23	14	17	28	3	16	91	24	2	6				7	
2	10		11	2	27	9	28	17	21	11	22	2	88	1	5	8	9	22	20	21	15	52		5	
Annual Grasses																									
Perennial Forbs	14	1	10	11	1	6	4	3	11	3		9	16	4	2	1	4	103		39	7	3		6	
			18	2		12		15			11	12		6	39	29		38	1	1					
Annual Forbs	1	2	<1	1	4	<1	21	<1	<1	<1	1	1	1	3	<1	<1	<1	<1	<1	<1	7	2	5	2	
Half Shrubs																								1	
Total Biomass	51	32	55	31	36	33	111	14	16	28	2	38	48	38	85	16	23	17	97	29	106	18	61	13	12
	29	41	33	17	3	45	28	43	19	22	37	40	29	112	57	38	2	20	28	67	21	23	25	59	20

Table 2.5.3-13

Fresh weight estimates (grams) for intensive study plot BJ25 (5-F), pinyon-juniper woodland.
July 1981

Quadrat Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
<i>Agropyron smithii</i>				9	5	5	4		3	14		1						4	2		2		2		
<i>Bromus tectorum</i>	<1	2	1				<1	2	<1			1	1					<1	1	<1	<1	<1			
<i>Oryzopsis hymenoides</i>	6		21	2	52						5		7	7						4	58	14			
Perennial Grasses	37	4	3		10	5	12	19	25	8	6	68	18		5	10	23	11	10			1	2	12	4
Annual Grasses	2	2	7	10	1	8	6	11	10	64	25	1	5	16	2	4			123	27	5	6	48	41	
Perennial Forbs	1		2		1	<1			<1	1			3				1	<1			1		5	7	1
Annual Forbs	<1				<1		1		<1	<1		1	<1		<1	<1	<1	<1	<1	<1	<1	<1			
Half Shrubs																									2
Total Biomass	44	6	27	11	68	10	13	21	28	23	11	70	29	7	5	10	24	11	14	7	58	15	2	12	4
	2	14	8	14	3	10	12	11	10	65	26	2	6	16	9	9	29	22	24	123	31	36	19	57	42

Table 2.5.3-14

Fresh weight estimates (grams) for intensive study plot BJ26 (6-F), pinyon-juniper woodland
July 1981

Quadrat Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	
<i>Agropyron smithii</i>	2					2	4			2						2		2	2	1	1				
<i>Bromus tectorum</i>																<1									
<i>Oryzopsis hymenoides</i>		8	2						19		16	1			4	4		2			6	11		4	2
Perennial Grasses	12	22		26	19	8	16	28	33	3	28	7	13	24	12	18	32	16	9	27	2	9	2	26	15
	20	4	13	14	9	21	17	11	13	12	3	11	5	21	53	22	2	2	2	18	11	2	10	25	12
Annual Grasses																									
Perennial Forbs	21	6	<1	7	3	1	2	<1	1	1	5	4		2	<1	2	1	3	<1	1	3	5	<1	3	2
	2										1	2			<1	3	8	<1							
Annual Forbs	<1		<1	<1	<1	1			<1	<1	<1		<1	<1	<1	<1	<1	<1		<1			<1		
	<1	<1	<1	<1	<1	<1			<1	<1	<1				<1	<1	<1		<1						
Half Shrubs																			2						
Total Biomass	33	28	8	26	22	8	17	33	34	27	28	27	14	26	12	24	39	21	11	29	9	20	2	29	17
	22	4	15	23	12	22	21	11	13	12	6	13	5	21	53	25	10	6	4	18	14	9	12	29	14

Table 2.5.3-15

Oven dry weights (grams/m²) for intensive study plot 1-F. 1981

Quadrat Number	<i>Agropyron smithii</i>	<i>Bromus tectorum</i>	<i>Oryzopsis hymenoides</i>	Perennial Grasses	Perennial Forbs	Annual Forbs	Half Shrubs	Total Biomass
2	-	1.90	7.98	25.96	2.38	-	-	38.22
3	-	-	-	84.12	-	-	-	84.12
12	-	0.83	6.03	35.95	-	-	-	42.81
17	-	-	-	17.66	2.30	-	-	19.96
26	-	-	6.20	0.24	-	-	-	6.44
29	-	0.33	9.29	5.37	0.23	-	-	15.22
37	-	-	0.52	39.62	8.74	-	-	48.88
39	-	-	0.20	13.83	-	-	-	14.03
45	-	-	-	17.85	0.09	-	-	17.94
46	-	1.38	10.38	15.59	10.76	-	-	38.11

Oven dry weights (grams/m²) for Veg Plot 2. 1981

7	-	35.28	38.30	-	1.06	11.89	-	86.53
13	-	20.49	0.57	5.21	3.81	0.12	-	30.20
16	3.55	0.34	-	0.48	0.42	0.02	-	4.81
19	-	3.46	-	51.52	0.03	0.07	-	55.08
20	-	1.12	-	10.65	1.60	-	-	13.37
21	-	0.75	-	1.72	40.26	-	-	42.73
33	-	0.02	-	18.91	7.42	0.03	-	26.38
37	1.26	1.19	-	15.21	5.33	-	-	22.99
38	10.57	0.25	-	0.69	-	0.24	-	11.75
45	4.19	0.80	-	10.86	17.32	0.03	-	33.02

Table 2.5.3-16

Oven dry weights (grams/m²) for Veg Plot 5. 1981

Quadrat Number	<i>Agropyron smithii</i>	<i>Bromus tectorum</i>	<i>Dryzopsis hymenoides</i>	Perennial Grasses	Perennial Forbs	Annual Forbs	Half Shrubs	Total Biomass
5	2.61	-	22.70	2.53	0.36	-	-	28.20
13	0.14	0.02	2.79	8.27	0.54	0.07	-	11.83
15	-	-	-	1.39	-	0.04	-	1.43
27	-	0.03	7.02	0.09	0.06	0.02	-	7.22
28	-	-	-	4.32	0.13	-	-	4.45
32	0.81	-	-	3.93	0.27	-	-	5.01
40	-	0.02	4.25	0.08	-	0.02	-	4.37
43	-	-	11.61	-	-	-	-	11.61
45	-	-	-	99.55	-	0.02	-	99.57
49	-	0.02	-	30.85	4.87	-	0.59	36.33

Oven dry weights (grams/m²) for Veg Plot 6. 1981

5	-	-	-	8.19	1.69	0.03	-	9.91
9	-	-	-	16.16	0.09	0.02	-	16.27
12	-	-	8.53	4.70	1.83	-	-	15.06
16	-	-	2.18	6.96	0.45	0.06	-	9.65
20	0.23	-	-	11.01	0.56	-	-	11.80
25	-	-	0.57	5.00	-	-	-	5.57
26	-	-	-	6.99	1.38	-	-	8.37
31	-	-	-	11.73	1.14	0.10	-	12.97
44	0.90	-	-	1.49	-	-	-	2.39
49	-	-	3.41	12.43	-	-	-	15.84

Table 2.5.3-17

Regression Equations used for converting fresh weight estimates to oven dry weights in Plot BJ21 (Plot 1). 1981 Data

Species/ Species Group	Regression Equations	Correlation Coefficient
<i>Agropyron smithii</i>		
<i>Bromus tectorum</i>	$y = 0.34 x + 0.34$	0.83
<i>Oryzopsis hymenoides</i>	$y = 0.56 x + 0.48$	0.83
Perennial Grasses	$y = 0.72 x - 10.12$	0.94
Perennial Forbs	$y = 0.48 x + 0.41$	0.90
Annual Forbs		
Half Shrubs		

Table 2.5.3-18

Regression equations used for converting fresh weight estimates to oven dry weights in Plot BJ22 (Plot 2). 1981 Data

Species/ Species Group	Regression Equations	Correlation Coefficient
<i>Agropyron smithii</i>	$y = 0.41 x + 33$	0.97
<i>Bromus tectorum</i>	$y = 1.16 x - 0.85$	0.99
<i>Orysopsis hymenoides</i>	$y = 0.67 x - 0.78$	1.00
Perennial Grasses	$y = 0.58 x - 0.50$	0.99
Perennial Forbs	$y = 0.40 x + 0.31$	0.99
Annual Forbs	$y = 0.57 x - 0.14$	0.99

Table 2.5.3-19

Regression equations used for converting fresh weight estimates to oven dry weights in Plot BJ25 (Plot 5-F). 1981 Data

Species/ Species Group	Regression Equations	Correlation Coefficient
<i>Agropyron smithii</i>	$y = 0.52 x - 0.57$	0.86
<i>Bromus tectorum</i>	$y = 1.00 x - 0.08$	1.00
<i>Oryzopsis hymenoides</i>	$y = 0.42 x + 1.40$	0.99
Perennial Grasses	$y = 0.81 x - 3.28$	0.99
Perennial Forbs	$y = 0.76 x - 0.85$	0.96
Annual Forbs	$y = 0.05 x + 0.02$	0.92

Table 2.5.3-20

Regression equations used for converting fresh weight estimates to oven dry weights in Plot BJ26 (Plot 6). 1981 Data

Species/ Species Group	Regression Equations	Correlation Coefficient
<i>Agropyron smithii</i>	$y = 0.67 x - 0.44$	1.00
<i>Bromus tectorum</i>		
<i>Oryzopsis hymenoides</i>	$y = 0.52 x + 0.26$	0.97
Perennial Grasses	$y = 0.45 x + 0.09$	0.93
Perennial Forbs	$y = 0.445 x + 0.13$	0.77
Annual Forbs	$y = 0.68 x - 0.03$	0.92

Table 2.5.3-21

Oven dry weights (grams/m²) for range cages and adjacent open areas in the chained pinyon-juniper rangeland community type. 1981

Quadrat Number	<i>Agropyron smithii</i>	<i>Oryzopsis hymenoides</i>	<i>Bromus tectorum</i>	Perennial Grasses	Perennial Forbs	Annual Forbs	Half Shrubs	Total Biomass
61	8.28	-	0.02	15.20	0.50	-	-	24.00
62	-	28.81	2.06	54.01	-	0.01	-	84.89
63	4.95	4.10	0.08	5.03	-	-	-	14.16
64	10.00	-	-	17.11	5.85	-	-	32.96
65	-	-	0.02	65.72	0.71	0.03	-	66.48
66	45.06	-	0.09	7.05	14.26	0.01	-	66.47
67	15.09	-	0.11	30.97	27.31	0.37	-	73.85
68	-	42.08	0.03	7.19	8.49	-	-	57.79
69	8.34	-	0.41	7.52	3.15	0.22	-	19.64
70	-	0.81	0.51	5.95	8.80	-	-	16.07
71	2.74	2.05	-	24.16	2.73	0.02	-	31.70
72	2.35	-	-	45.23	-	-	-	47.58
73	6.82	-	-	34.82	3.69	0.09	-	45.42
74	15.79	-	9.94	3.10	7.34	2.06	-	38.23
75	8.62	-	1.99	18.27	2.83	-	3.56	35.27
61	1.25	-	0.03	11.08	0.58	0.02	-	12.96
62	-	0.90	-	10.24	0.62	-	-	11.76
63	2.11	-	.04	-	0.57	-	-	2.72
64	6.12	-	-	7.26	5.98	-	-	19.36
65	0.68	-	0.06	9.31	0.02	0.02	-	10.09
66	4.09	-	0.14	9.88	11.91	0.04	-	26.06
67	5.39	-	-	4.18	0.84	-	-	10.41
68	-	5.94	-	5.78	1.58	-	-	13.30
69	12.33	-	0.30	1.49	4.03	1.14	1.58	20.87
70	-	-	0.84	3.35	6.95	-	-	11.14
71	0.60	0.98	-	5.85	0.46	-	-	7.89
72	2.24	-	-	9.26	3.63	0.06	-	15.19
73	3.21	-	4.23	26.72	8.00	0.02	-	42.18
74	10.25	1.32	0.34	1.95	8.40	0.20	-	22.46
75	3.95	-	0.12	2.96	17.92	-	-	24.95

Table 2.5.3-22

Oven dry weights (grams/m²) for range cages and adjacent open areas in the pinyon-juniper woodland community type. 1981

	Quadrat Number	<i>Agropyron smithii</i>	<i>Oryzopsis hymenoides</i>	<i>Bromus tectorum</i>	Perennial Grasses	Perennial Forbs	Annual Forbs	Half Shrubs	Total Biomass
FENCED	46	-	-	1.75	0.63	-	-	-	2.38
	47	-	-	-	4.53	0.88	-	-	5.41
	48	-	1.64	-	0.90	-	-	-	2.54
	49	-	0.16	-	1.41	0.21	-	-	1.78
	50	-	-	-	1.98	2.03	-	-	4.01
	51	1.41	-	-	2.12	5.15	-	-	8.68
	52	4.34	-	-	3.30	1.44	-	8.55	17.63
	53	-	1.80	-	5.60	0.57	-	-	7.97
	54	-	1.53	0.01	2.22	0.50	-	-	4.26
	55	3.70	-	0.06	2.83	0.11	0.03	-	6.73
	56	0.20	-	0.02	5.28	0.74	-	-	6.24
	57	0.58	-	-	8.32	1.67	-	-	10.57
	58	-	-	-	4.96	13.07	-	-	18.03
OPEN	59	6.38	-	-	4.59	0.84	-	-	11.81
	60	-	-	-	8.24	0.95	-	-	9.19
	46	-	-	2.05	-	-	0.06	-	2.11
	47	-	-	-	4.23	0.24	0.16	-	4.63
	48	-	1.50	-	-	0.13	0.08	-	1.71
	49	-	1.51	-	1.53	0.07	-	-	3.11
	50	-	-	-	0.71	0.02	-	-	0.73
	51	0.23	-	-	1.57	3.14	-	-	4.94
	52	2.02	-	-	0.98	-	-	-	3.00
	53	-	0.58	0.20	5.07	0.97	-	-	6.82
	54	-	9.45	-	1.00	0.19	0.01	-	10.65
	55	5.70	-	0.49	2.52	0.11	0.07	-	8.89
	56	1.38	-	-	-	1.05	-	-	2.43
	57	0.54	-	-	3.55	0.98	-	-	5.07
	58	-	-	-	2.96	14.74	-	1.00	18.70
	59	2.43	0.88	-	0.89	0.06	0.02	-	4.28
	60	-	1.53	0.03	10.84	-	-	-	12.40

Table 2.5.3-23

Oven dry weights (grams/m²) for range cages and adjacent open areas in the upland sagebrush community type. 1981

	Quadrat Number	<i>Agropyron smithii</i>	<i>Oryzopsis hymenoides</i>	<i>Bromus tectorum</i>	Perennial Grasses	Perennial Forbs	Annual Forbs	Half Shrubs	Total Biomass
FENCEL	76	3.70	-	-	12.98	9.43	-	-	26.11
	77	17.16	-	-	14.70	6.53	-	-	38.39
	78	6.23	-	-	15.83	16.00	0.19	-	38.25
	79	10.96	-	-	29.33	7.20	0.09	-	47.58
	80	7.51	-	-	18.44	15.08	-	-	41.03
	81	11.41	-	0.07	26.24	5.46	-	-	43.18
	82	1.54	-	-	14.18	0.87	-	-	16.59
	83	12.11	-	-	14.25	12.38	-	3.44	42.18
	84	2.54	-	-	19.70	12.77	-	-	35.01
	85	0.15	-	-	20.12	8.82	-	-	29.09
	86	2.49	-	0.03	29.24	20.01	-	-	51.77
	87	13.92	-	-	-	4.11	-	7.30	25.33
OPEN	88	11.52	1.52	-	20.31	21.18	-	5.80	60.33
	89	4.09	-	0.04	20.61	6.58	0.02	0.43	31.77
	90	8.24	-	-	18.48	13.97	-	-	40.69
	76	2.05	-	-	13.38	1.29	-	-	16.72
	77	6.81	-	-	10.02	2.71	-	-	19.54
	78	4.04	-	-	9.29	20.31	0.02	-	33.66
	79	2.89	-	-	8.65	11.56	-	-	23.10
	80	3.10	-	-	6.19	5.95	-	-	15.24
	81	1.00	-	0.03	8.09	1.12	-	-	10.24
	82	6.68	-	-	10.01	-	-	-	16.69
	83	9.76	-	-	7.21	17.0	0.09	2.96	37.02
	84	1.53	-	-	6.51	3.62	-	-	11.66
	85	0.78	-	-	9.97	17.49	-	-	28.24
	86	1.05	-	20.54	-	24.72	-	0.25	46.56
	87	23.85	-	-	4.55	0.60	-	-	29.00
	88	17.33	-	-	10.27	18.16	-	-	45.76
	89	6.57	0.51	-	9.53	2.73	-	2.63	21.97
	90	4.78	-	-	4.84	10.52	-	-	20.14

Table 2.5.3-24

Oven dry weights (grams/m²) for range cages and adjacent open areas in the bottomland sagebrush community type. 1981

	Quadrat Number	<i>Agropyron smithii</i>	<i>Oryzopsis hymenoides</i>	<i>Bromus tectorum</i>	Perennial Grasses	Perennial Forbs	Annual Forbs	Half Shrubs	Total Biomass
FENCED	31	0.46	-	8.36	11.62	-	0.22	-	20.66
	32	-	-	2.50	1.67	0.94	2.00	-	7.11
	33	-	-	-	7.35	-	0.04	-	7.39
	34	-	-	0.43	0.06	20.04	-	-	20.53
	35	-	-	1.30	-	2.58	-	-	3.88
	36	6.88	-	1.62	-	3.51	3.68	-	15.69
	37	1.09	3.87	-	-	-	0.51	-	5.47
	38	-	13.70	-	30.41	0.24	0.30	-	44.65
	39	2.30	-	-	14.57	30.84	7.48	-	55.19
	40	-	-	49.78	6.68	2.15	3.25	-	61.86
	41	1.42	-	0.15	6.68	6.53	0.98	-	15.76
	42	0.49	-	1.23	5.47	1.62	1.10	-	9.91
	43	-	0.11	0.29	6.45	2.38	-	-	9.23
	44	-	-	0.20	99.22	0.93	0.15	-	100.50
	45	-	-	11.73	70.86	24.77	20.92	-	128.28
OPEN	31	-	-	1.70	1.86	-	0.08	-	3.64
	32	0.89	-	0.75	3.62	1.83	0.11	-	7.20
	33	-	-	0.03	2.75	-	-	-	2.78
	34	-	-	-	1.20	40.21	3.73	-	45.14
	35	-	2.66	0.56	0.93	2.16	0.04	-	6.35
	36	-	1.71	-	-	3.55	0.46	-	5.72
	37	0.26	8.78	0.11	-	3.27	0.17	-	12.59
	38	-	-	1.16	4.50	4.24	0.13	-	10.03
	39	2.66	-	-	4.20	42.98	2.74	-	52.58
	40	-	-	0.97	7.16	0.70	0.15	-	8.98
	41	2.96	-	0.57	-	-	0.33	-	3.86
	42	-	-	1.24	3.70	0.06	-	-	5.00
	43	-	-	0.02	1.24	2.04	-	-	3.30
	44	-	-	-	24.07	1.98	1.56	-	27.61
	45	0.87	-	0.58	23.68	-	4.81	-	29.94

Table 2.5.3-25

Oven dry weights (grams/m²) for range cage and adjacent open areas in the irrigated chained rangeland community type. 1981

	Quadrat Number	<i>Agropyron smithii</i>	<i>Oryzopsis hymenoides</i>	<i>Bromus tectorum</i>	Perennial Grasses	Perennial Forbs	Annual Forbs	Half Shrubs	Total Biomass
FLOODED	1	90.26	54.93	8.24	11.88	0.01	0.03	14.95	180.30
	2	266.12	0.53	-	-	0.02	.07	-	266.74
	3	-	26.16	0.14	63.80	26.05	-	3.18	119.33
	4	38.07	24.38	0.21	15.69	15.14	0.48	-	93.97
	5	-	21.57	0.41	84.43	48.76	-	-	155.17
	6	-	9.94	0.05	75.73	12.33	-	5.73	103.78
	7	-	6.52	0.16	37.94	2.66	-	-	47.28
	8	7.66	-	-	66.33	22.38	-	-	96.37
	9	53.75	-	32.21	73.65	1.57	5.05	-	166.2
	10	57.71	0.24	-	6.93	8.80	-	-	73.65
	11	-	-	-	61.95	1.93	-	-	63.88
	12	-	30.83	1.27	9.48	18.02	-	-	59.60
	13	21.79	-	11.41	163.83	10.91	-	-	207.94
	14	42.97	18.28	5.17	42.88	0.21	-	-	109.51
	15	97.32	-	-	38.50	22.22	-	-	158.04
OPEN	1	65.57	0.23	0.93	10.16	0.26	2.21	-	79.36
	2	77.91	-	-	4.79	10.69	-	-	93.39
	3	-	5.96	4.30	34.92	14.85	-	-	60.03
	4	-	9.10	-	61.22	1.53	-	-	71.85
	5	-	-	.03	40.19	5.45	-	3.04	48.71
	6	-	-	-	31.17	7.64	-	-	38.81
	7	-	5.63	0.13	9.07	3.29	-	-	18.12
	8	-	4.48	0.68	29.21	9.29	-	2.05	45.71
	9	39.62	7.84	2.91	5.87	13.20	9.55	-	78.99
	10	40.20	-	-	0.44	14.62	-	1.86	57.12
	11	-	12.43	0.68	5.11	1.87	-	-	20.09
	12	-	31.78	1.29	0.89	11.74	-	-	45.70
	13	0.51	1.82	1.05	52.39	0.40	-	-	56.17
	14	28.79	-	0.29	7.80	44.27	-	-	81.15
	15	22.26	-	-	17.25	9.55	-	-	49.06

Table 2.5.3-26

Mean production (grams/m²) ± the standard error of the mean (S.E.), frequency, and range of observed values for clipped plots in the chained rangeland community type. 1981 Data

	Mean + S.E.	Sample Size	Frequency (%)	Range of Values
<u>OPEN AREAS</u>				
<i>Agropyron smithii</i>	3.48 ± 0.97	15	80	0-12.33
<i>Bromus tectorum</i>	0.46 ± 0.28	15	60	0-4.23
<i>Oryzopsis hymenoides</i>	0.61 ± 0.40	15	27	0-5.94
Perennial Grasses	7.29 ± 1.66	15	93	0-11.08
Perennial Forbs	4.90 ± 1.31	15	100	0.02-17.92
Annual Forbs	0.24 ± 0.10	15	47	0-1.14
Half Shrubs	0.11 ± 0.11	15	7	0-1.58
Total Biomass	16.76 ± 2.49	15		2.72-42.18
<u>FENCED PLOTS</u>				
<i>Agropyron smithii</i>	8.54 ± 2.94	15	73	0-45.06
<i>Bromus tectorum</i>	1.02 ± 0.66	15	73	0-9.94
<i>Oryzopsis hymenoides</i>	5.19 ± 3.25	15	33	0-42.08
Perennial Grasses	22.76 ± 5.05	15	100	3.10-65.72
Perennial Forbs	5.71 ± 1.87	15	80	0-27.31
Annual Forbs	0.19 ± 0.14	15	53	0-2.81
Half Shrubs	0.28 ± 0.28	15	7	0-3.56
Total Biomass	43.63 ± 5.70	15	111-215	16.07-84.89

Table 2.5.3-27

Mean production (grams/m²) + the standard error of the mean (S.E.), frequency, and range of observed values for clipped plots in the pinyon-juniper woodland community type. 1981 Data

	Mean + S.E.	Sample Size	Frequency (%)	Range of Values
<u>OPEN AREAS</u>				
<i>Agropyron smithii</i>	0.82 \pm 0.41	15	40	0-5.70
<i>Bromus tectorum</i>	0.18 \pm 0.14	15	27	0-2.05
<i>Oryzopsis hymenoides</i>	1.03 \pm 0.62	15	40	0-9.45
Perennial Grasses	2.39 \pm 0.73	15	80	0-10.84
Perennial Forbs	1.45 \pm 0.97	15	80	0-14.74
Annual Forbs	0.03 \pm 0.01	15	40	0-0.16
Half Shrubs	0.07 \pm 0.07	15	7	0-1.00
Total Biomass	5.96 \pm 1.26	15		0.73-18.70
<u>FENCED PLOTS</u>				
<i>Agropyron smithii</i>	1.11 \pm 0.52	15	40	0-6.38
<i>Bromus tectorum</i>	0.12 \pm 0.11	15	27	0-1.75
<i>Oryzopsis hymenoides</i>	0.34 \pm 0.18	15	27	0-1.80
Perennial Grasses	3.79 \pm 0.63	15	100	0.63-8.32
Perennial Forbs	1.88 \pm 0.86	15	87	0-13.07
Annual Forbs	0.002 \pm 0.002	15	7	0-0.03
Half Shrubs	0.57 \pm 0.57	15	7	0-8.55
Total Biomass	7.81 \pm 1.30	15		1.78-18.03

Table 2.5.3-28

Mean production (grams/m²) \pm the standard error of the mean (S.E.), frequency, and range of observed values for clipped plots in the upland sagebrush community type. 1981 Data

	Mean \pm S.E.	Sample Size	Frequency (%)	Range of Values
<u>OPEN AREAS</u>				
<i>Agropyron smithii</i>	6.15 \pm 1.69	15	100	0.78-23.85
<i>Bromus tectorum</i>	1.37 \pm 1.37	15	13	0-20.54
<i>Oryzopsis hymenoides</i>	0.03 \pm 0.03	15	7	0-0.51
Perennial Grasses	7.90 \pm 0.82	15	93	0-13.38
Perennial Forbs	9.19 \pm 2.18	15	93	0-24.72
Annual Forbs	0.01 \pm 0.01	15	13	0-0.09
Half Shrubs	0.39 \pm 0.25	15	20	0-2.96
Total Biomass	25.04 \pm 2.96	15		10.24-46.56
<u>FENCED PLOTS</u>				
<i>Agropyron smithii</i>	7.57 \pm 1.32	15	100	0.15-13.92
<i>Bromus tectorum</i>	0.01 \pm 0.01	15	20	0-0.07
<i>Oryzopsis hymenoides</i>	0.10 \pm 0.10	15	7	0-1.52
Perennial Grasses	17.96 \pm 1.76	15	93	0-29.33
Perennial Forbs	10.70 \pm 1.51	15	100	0.87-21.18
Annual Forbs	0.02 \pm 0.01	15	20	0-0.19
Half Shrubs	1.13 \pm 0.62	15	27	0-7.30
Total Biomass	37.82 \pm 2.87	15	III-217	16.59-60.33

Table 2.5.3-29

Mean production (grams/m²) + the standard error of the mean (S.E.), frequency, and range of observed values for clipped plots in the bottomland sagebrush community type. 1981 Data

	Mean + S.E.	Sample Size	Frequency (%)	Range of Values
<u>OPEN AREAS</u>				
<i>Agropyron smithii</i>	0.51 \pm 0.25	15	33	0-2.96
<i>Bromus tectorum</i>	0.51 \pm 0.14	15	80	0-1.70
<i>Oryzopsis hymenoides</i>	0.88 \pm 0.60	15	20	0-8.78
Perennial Grasses	5.26 \pm 2.02	15	80	0-24.07
Perennial Forbs	9.37 \pm 4.13	15	73	0-42.98
Annual Forbs	0.95 \pm 0.40	15	80	0-4.81
Total Biomass	14.98 \pm 4.16	15		2.78-52.58
<u>FENCED PLOTS</u>				
<i>Agropyron smithii</i>	0.84 \pm 0.47	15	40	0-6.88
<i>Bromus tectorum</i>	5.17 \pm 3.31	15	73	0-49.78
<i>Oryzopsis hymenoides</i>	1.18 \pm 0.93	15	20	0-13.70
Perennial Grasses	21.75 \pm 8.04	15	80	0-99.22
Perennial Forbs	6.44 \pm 2.60	15	80	0-30.84
Annual Forbs	2.71 \pm 1.40	15	80	0-20.92
Total Biomass	33.74 \pm 9.76	15		3.88-128.28

Table 2.5.3-30

Mean Production (gram/m²) \pm the standard of error of the mean (S.E.), frequency, and range of observed values for clipped plots in the Irrigated Area. 1981 Data

Species	Mean \pm S.E.	Sample Size	Frequency (%)	Range of Values
<u>OPEN AREAS</u>				
<i>Agropyron smithii</i>	18.32 \pm 6.85	15	47	0-77.91
<i>Bromus tectorum</i>	0.82 \pm 0.32	15	67	0-4.30
<i>Oryzopsis hymenoides</i>	8.81 \pm 2.42	15	60	0-31.78
Perennial Grasses	20.70 \pm 5.05	15	100	0.44-61.22
Perennial Forbs	9.91 \pm 2.79	15	100	0.26-44.27
Annual Forbs	0.78 \pm 0.64	15	13	0-9.55
Half Shrubs	0.46 \pm 0.26	15	20	0-3.04
Total Biomass	56.28 \pm 5.65	15	100	18.12-93.39
<u>FENCED PLOTS</u>				
<i>Agropyron smithii</i>	45.04 \pm 18.00	15	60	0-266.12
<i>Bromus tectorum</i>	3.95 \pm 2.21	15	67	0-32.21
<i>Oryzopsis hymenoides</i>	12.89 \pm 4.19	15	67	0-54.93
Perennial Grasses	50.20 \pm 10.89	15	93	0-163.83
Perennial Forbs	12.73 \pm 3.47	15	100	0.01-48.76
Annual Forbs	0.38 \pm 0.34	15	27	0-5.05
Half Shrubs	1.59 \pm 1.04	15	20	0-14.95
Total Biomass	126.79 \pm 15.87	15 III-219	100	47.28-266.74

Table 2.5.3-31 Fresh weight estimates (grams/0.10 m²) for irrigation/fertilizer study plots. September 1981.

Treatment Number	3a																													
Fertilizer Level (Lbs/Acre) N,P	100,100																													
Year Fertilizer Applied	1980 & 1981																													
Sprinkler Time Set	18 hrs.																													
Quadrat Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>Agropyron smithii</i>	32	23	11	9	20	19	34	16	25	18	15	9	26	22	17	33	20	34	19	29	34	28	16	27	38	42	31	17	32	8
<i>Oryzopsis hymenoides</i>	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
<i>Bromus tectorum</i>	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<1	--	1	--
Perennial Grasses	7	8	3	2	2	1	4	8	5	15	6	1	5	6	5	12	7	4	5	8	11	1	10	7	4	1	2	4	4	15
Perennial Forbs	--	6	2	5	1	2	1	2	--	<1	1	5	4	<1	5	--	1	--	2	3	2	2	--	--	--	--	--	--	--	2
Annual Forbs	<1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2	--	--	--	--	--	3	4	1	--
Half Shrubs	--	--	--	--	4	--	--	--	--	--	--	--	--	--	--	--	--	2	--	--	--	--	--	--	--	--	--	--	2	2
TOTAL	39	37	16	16	27	22	39	26	30	33	22	15	35	28	27	45	28	40	26	40	49	31	26	34	42	43	36	25	38	27

Table 31. Fresh weight estimates (grams/0.10 m²) for irrigation/fertilizer study plots. September 1981.

Treatment Number		3b														
Fertilizer Level		100,100														
Year Fertilizer Applied		1980 only														
Sprinkler Time Set		12 hrs.														
Quadrat Number		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>Agropyron smithii</i>		--	7	--	--	--	--	7	--	3	14	7	10	3	10	7
<i>Oryzopsis hymenoides</i>	1	--	--	--	6	4	6	2	1	--	--	--	--	--	--	--
<i>Bromus tectorum</i>	--	--	1	<1	1	<1	2	3	1	--	--	<1	--	<1	--	--
Perennial Grasses	2	12	11	2	6	3	4	8	12	--	--	--	8	5	7	
Perennial Forbs	16	--	--	--	2	3	--	10	2	1	1	--	3	<1		
Annual Forbs	--	<1	--	--	--	--	--	2	<1	--	--	--	5	--	--	--
Half Shrubs	8	--	--	--	--	--	--	--	--	--	3	--	--	--	--	--
TOTAL	27	19	12	8	13	12	15	24	18	15	8	13	16	18	14	

Table 31. Fresh weight estimates (grams/0.10 m²) for irrigation/fertilizer study plots. September 1981.

Treatment Number	4a																												
Fertilizer Level (Lbs/Acre) N,P	200,100																												
Year Fertilizer Applied	1980 & 1981																												
Sprinkler Time Set	18 hrs.																												
Quadrat Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Agropyron smithii	58	31	33	27	25	10	35	30	52	19	18	10	23	22	28	17	15	18	13	10	18	17	12	6	6	7	15	28	11
Oryzopsis hymenoides	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromus tectorum	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Perennial Grasses	42	7	5	12	11	18	21	15	--	8	16	9	12	2	12	8	7	20	11	5	13	2	14	5	11	8	3	5	20
Perennial Forbs	--	3	--	2	4	10	3	--	--	2	--	--	--	3	--	--	1	1	<1	10	--	--	4	1	4	5	--	--	<
Annual Forbs	--	--	--	--	--	--	--	--	--	<1	2	--	--	--	--	4	--	<1	--	--	--	7	--	--	--	2	--	1	--
Half Shrubs	--	--	--	--	--	--	--	--	--	--	--	10	--	--	8	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TOTAL	100	41	38	41	40	38	59	45	52	29	36	29	35	27	48	29	23	39	24	25	31	26	30	12	21	22	18	33	31

Table 31. Fresh weight estimates (grams/0.10 m²) for irrigation/fertilizer study plots. September 1981.

Treatment Number	4b														
Fertilizer Level (Lbs/Acre) N,P	200,100														
Year Fertilizer Applied	1980 only														
Sprinkler Time Set	12 hrs.														
Quadrat Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>Agropyron smithii</i>	24	--	14	8	--	4	4	--	10	11	31	3	3	10	5
<i>Oryzopsis hymenoides</i>	--	--	--	--	--	--	--	--	--	--	--	2	--	--	--
<i>Bromus tectorum</i>	2	2	--	--	4	<1	2	--	--	<1	1	--	--	--	2
Perennial Grasses	11	12	13	1	7	4	6	12	--	12	--	7	9	--	2
Perennial Forbs	2	4	1	1	--	10	2	--	4	--	--	8	--	--	--
Annual Forbs	--	--	--	--	--	--	--	3	--	--	<1	--	1	--	--
Half Shrubs	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TOTAL	39	18	28	10	11	18	14	15	14	23	32	20	13	10	9

Table 2.5.3-32

Oven dry weights (grams/0.10m²) for herbaceous biomass in fertilizer and irrigation treatments for irrigation study plots. 1981 Data

Treatment Number	Year(s) Fertilized	Quadrat Number	<i>Agropyron smithii</i>	<i>Bromus tectorum</i>	<i>Oryzopsis hymenoides</i>	Perennial Grasses	Perennial Forbs	Annual Forbs	Half Shrubs	Total Biomass
1a	N/F	1	-	0.10	-	3.17	0.04	-	-	3.31
1a	N/F	3	3.38	-	-	-	-	-	-	3.38
1a	N/F	12	-	-	3.29	-	-	-	2.88	6.17
1b	N/F	1	2.05	-	-	-	0.21	-	0.98	3.24
1b	N/F	8	1.38	0.03	0.16	0.74	1.04	-	-	3.35
3a	1980	1	12.38	-	-	1.80	-	0.02	-	14.20
3a	1980	2	10.53	-	-	2.06	1.95	-	-	14.54
3a	1980	12	2.91	-	-	0.13	1.34	-	-	4.38
3b	1980	1	-	-	0.26	0.31	4.71	-	1.65	6.93
3b	1980	4	-	0.21	2.01	0.95	-	-	-	3.17
3b	1980	11	2.66	-	-	-	0.06	-	-	2.72
4a	1980	1	4.70	-	-	3.12	-	0.79	-	8.61
4a	1980	5	2.36	-	-	1.83	2.21	-	-	6.40
4a	1980	8	4.40	-	-	4.95	1.70	-	-	11.05
4a	1980	15	12.10	-	-	0.55	0.03	0.37	-	13.05
4b	1980	1	5.09	0.06	-	2.69	0.27	-	-	8.11
4b	1980	4	2.31	-	-	0.03	0.06	-	-	2.40
4b	1980	9	2.89	-	-	-	0.85	-	-	3.74
3a	1980-81	1	13.56	-	-	3.79	-	-	-	17.35
3a	1980-81	4	7.26	-	-	1.28	0.96	-	-	9.50
3a	1980-81	12	10.88	0.14	-	0.82	-	0.66	-	12.50
3b	1980-81	1	1.61	0.83	-	0.37	0.03	-	-	2.84
3b	1980-81	2	-	-	8.48	4.62	1.15	0.02	-	14.27
3b	1980-81	15	-	0.04	1.40	1.11	-	-	-	2.55
4a	1980-81	1	13.57	-	-	8.48	-	-	-	22.05
4a	1980-81	2	11.84	-	-	1.84	0.84	-	-	14.52
4a	1980-81	4	10.20	-	-	4.21	0.52	-	-	14.93
4a	1980-81	12	-	-	-	-	-	-	1.94	1.94
4b	1980-81	1	4.97	-	-	0.03	4.91	-	-	9.91
4b	1980-81	5	9.86	-	-	3.22	1.94	-	-	15.02
4b	1980-81	12	-	1.64	2.23	1.00	0.05	-	-	4.92

Table 2.5.3-33

Regression Equations for converting fresh weight estimates to oven dry weights in the irrigation/fertilization study plots 3a, 3b, 4a, and 4b which were fertilized in 1980 and 1981. 1981 Data

Species/ Species Group	Regression Equations	Correlation Coefficient
<i>Agropyron smithii</i>	$y = 0.23 x + 3.33$	0.84
<i>Bromus tectorum</i>	$y = 0.33 x - 0.02$	0.95
<i>Oryzopsis hymenoides</i>	$y = 0.33 x + 0.21$	0.99
Perennial Grasses	$y = 0.21 x + 0.62$	0.96
Perennial Forbs	$y = 0.20 x + 0.34$	0.98
Annual Forbs	$y = 0.22 x - 0.002$	1.00
Half Shrubs *	$y = 0.59 x - 2.69$	0.94

* Insufficient data, used regression equations calculated from study plots fertilized in 1980 only.

Table 2.5.3-34

Regression Equations for converting fresh weight estimates to oven dry weights in the irrigation/fertilization study plots 3a, 3b, 4a, and 4b which were fertilized in 1980 only, and study plot 1a and 1b which were not fertilized.

Species/ Species Group	Regression Equations	Correlation Coefficient
<i>Agropyron smithii</i>	$y = 0.35 x - 0.45$	0.93
<i>Bromus tectorum</i> *	$y = 0.33 x - 0.02$	0.95
<i>Oryzopsis hymenoides</i>	$y = 0.34 x - 0.12$	0.99
Perennial Grasses	$y = 0.28 x + 0.07$	0.92
Perennial Forbs	$y = 0.29 x - 0.13$	0.97
Annual Forbs	$y = 0.18 x + 0.08$	0.97
Half Shrubs	$y = 0.59 x - 2.69$	0.94

* Insufficient data, used regression equations calculated from study plots fertilized in 1980 and 1981.

Table 2.5.3-35

Herb quadrat summaries for Top Soil Stockpiles, which were seeded in the fall of 1978. Based on data from 25 permanently located quadrats. 1981. Values in percents \pm values are equal to the standard error of the mean.

Species	Mean Cover	Relative Cover	Range of Cover Values	Frequency
<u>Herbaceous species</u>				
<i>Agropyron cristatum</i>	1.40	6.34	0-4	60
<i>Agropyron intermedium</i>	1.64	7.43	0-8	48
<i>Agropyron intermedium</i> var. <i>trichophorum</i>	2.52	11.42	0-11	56
<i>Agropyron smithii</i>	4.56	20.66	0-15	88
<i>Agropyron spicatum</i> var. <i>inerme</i>	0.61	2.76	0-4	52
<i>Bromus inermis</i>	0.04	0.18	0-1	8
<i>Bromus tectorum</i>	<0.01	<0.01	0-<1	8
<i>Oryzopsis hymenoides</i>	0.08	0.36	0-1	8
<i>Hedysarum boreale</i>	4.28	19.39	0-23	52
<i>Medicago sativa</i>	<0.01	<0.01	0-<1	8
<i>Melilotus</i> spp.	4.22	19.19	0-27	52
<i>Linum lewisii</i>	<0.01	<0.01	0-<1	8
<i>Penstemon</i> spp.	<0.01	<0.01	0-<1	4
* <i>Salsoa iberica</i>	0.99	4.49	0-4	92
<i>Kochia iranica</i>	1.47	6.66	0-25	60
* <i>Chenopodium album</i>	<0.01	<0.01	0-<1	8
* <i>Teraxacum officinale</i>	0.04	0.18	0-1	4
<i>Erigeron</i> spp.	<0.01	<0.01	0-<1	4
<i>Astragalus ceramicus</i>	<0.01	<0.01	0-<1	8
<i>Lactuca serriola</i>	0.13	0.58	0-2	20
<u>Woody species</u>				
<i>Cercocarpus montanus</i>	<0.01	<0.01	0-<1	8
<i>Purshia tridentata</i>	0.09	0.41	0-1	20
Total Herb Cover	19.80		8-38	
Total Woody Cover in Herb Layer	0.10		0-1	

Table

Herb quadrat summaries for Top Soil Stockpiles, which were seeded in the fall of 1978. Based on data from 25 permanently located quadrats. 1981. Values in percents \pm values are equal to the standard error of the mean. (Cont'd)

Species	Mean Cover	Relative Cover	Range of Cover Values	Frequency
Litter	79.00		52-97	
Bare Soil	18.28		0-46	
Rock	2.72		0-10	

	Mean \pm S.E.	Range
No. of Herb Species/m ²	6.40 \pm 0.31	5-9
Total Species/m ²	6.68 \pm 0.35	5-10

Table 2.5.3-36 Fresh weight estimates (grams) for Top Soil Piles. 1981

Quadrat Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
<i>Agropyron</i> <i>spp.</i>	28	95	162	45	98	201	119	37	109	65	184	244	120	123	21	238	311	44	161	39	232	240	258	3	48
Perennial Grasses	--	--	--	2	--	1	---	--	2	--	---	---	---	---	--	---	---	--	---	--	---	---	---	---	---
<i>Bromus</i> <i>tectorum</i>	--	--	--	--	--	---	---	---	---	---	---	---	---	---	2	---	---	--	---	--	---	---	---	---	---
<i>Oryzopsis</i> <i>hymenoides</i>	--	--	--	4	6	1	---	--	---	---	---	---	---	---	--	---	---	--	---	--	---	---	---	---	---
Perennial Forbs	65	87	21	18	3	4	72	70	92	--	8	28	62	6	--	14	5	--	---	--	32	2	4	---	290
Annual Forbs	19	7	8	5	93	<1	1	10	9	8	4	7	1	9	33	1	---	6	2	8	9	<1	1	22	4
Biennial Forbs (<i>Melilotus spp.</i>)	1	--	--	2	--	---	---	--	---	--	---	---	215	203	4	2	192	8	185	91	4	68	294	52	

Table 2.5.3-37 Oven dry weight (grams/m²) for Top Soil Piles. 1981

Species	Quadrat Numbers									
	1	3	5	7	9	14	17	18	21	25
<i>Agropyron</i> <i>spp.</i>	21.65	90.91	47.61	50.15	58.94	77.07	166.06	25.61	129.85	33.14
<i>Oryzopsis</i> <i>hymenoides</i>	-----	-----	2.43	-----	-----	-----	-----	-----	-----	-----
<i>Bromus</i> <i>tectorum</i>	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Perennial Grasses	-----	-----	-----	-----	1.06	-----	-----	-----	-----	-----
Perennial Forbs	16.96	5.75	0.70	19.17	38.25	1.38	2.73	-----	13.24	145.54
Biennial Forbs	-----	-----	-----	-----	-----	70.45	0.27	116.09	38.57	19.49
Annual Forbs	8.47	1.83	26.43	0.02	3.74	4.01	-----	1.40	3.92	2.61
Total Biomass	47.08	98.49	77.17	69.34	101.99	152.91	169.06	143.10	143.09	200.78
TOTAL BIOMASS										

Table 2.5.3-38 Regression equations for converting fresh weight estimates (grams) to oven dry weights (grams) on Top Soil Storage Piles. 1981.

Species/Species Group	Regression Equation	Correlation Coefficient
<i>Agropyron</i> spp.	$y = 0.53 x + 2.93$	0.99
<i>Oryzopsis hymenoides</i>	$y = 0.34 x + 0.37$	1.00
<i>Bromus tectorum</i>	*	
Perennial grasses	$y = 0.34 x + 0.37$	1.00
Perennial forbs	$y = 0.50 x - 5.71$	0.99
Biennial forbs (<i>Melilotus</i> spp.)	$y = 0.45 x - 0.60$	0.90
Annual forbs	$y = 0.28 x + 0.97$	0.99

* No oven dry weight data.

Table 2.5.3-39

Mean production \pm the standard error of the mean (S. E.), frequency, and range of observed values for quadrats on Top-soil Storage Piles, 1981. Based on data derived from regression equations, Production values in grams/m².

Species/Species Group	Mean \pm S. E.	Sample Size	Frequency (%)	Range of Values
<i>Agropyron</i> spp.	71.30 \pm 9.43	25	100	4.52-167.76
Perennial grasses	0.11 \pm 0.06	25	12	0-1.05
<i>Bromus tectorum</i>	0.06 \pm 0.06	25	4	0-1.50
<i>Oryzopsis hymenoides</i>	0.17 \pm 0.10	25	12	0-2.41
Perennial forbs	14.90 \pm 5.80	25	72	0-27.01
Biennial forbs (<i>Melilotus</i> spp.)	23.47 \pm 7.87	25	56	0-131.70
TOTAL	113.76 \pm 8.63	25		34.84-192.55

Table 2.5.3-40 Fresh weight estimates (grams) for Oldland Gulch Brush Beating, 1981

Quadrat Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
<i>Agropyron cristatum</i>	45	26	54	14	71	4	--	4	15	2	--	--	15	37	--	--	--	--	--	--	--	--	2	--	--
<i>Agropyron smithii</i>	84	--	36	76	10	112	80	23	78	67	88	9	68	52	14	30	16	18	54	52	98	54	104	--	19
<i>Agropyron trachycaulum</i>	--	--	--	--	--	--	--	--	18	--	--	21	34	--	--	--	--	63	--	--	--	--	--	--	--
<i>Bromus tectorum</i>	10	10	2	3	14	3	--	<1	<1	1	<1	2	--	2	<1	--	<1	1	<1	3	1	2	1	<1	15
<i>Elymus cinereus</i>	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	48	--	--	--
<i>Elymus junceus</i>	--	32	19	--	13	--	--	--	--	--	--	--	5	--	--	--	--	--	--	--	--	--	--	--	--
<i>Oryzopsis hymenoides</i>	--	63	29	--	21	--	--	40	9	38	--	54	--	8	--	14	--	--	--	4	9	60	--	--	8
<i>Poa</i> spp.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4	--	--	--	--	--	--	--
<i>Sitanion hystrix</i>	--	--	--	--	--	--	--	--	--	--	--	--	2	--	--	--	--	--	--	--	--	--	--	5	--
<i>Sporobolus cryptandrus</i>	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2	--	--	--
<i>Stipa comata</i>	--	--	--	--	--	18	73	--	--	--	--	--	--	--	94	62	30	--	31	--	--	55	2	88	13
<i>Chenopodium</i> spp.	8	22	2	7	1	--	--	--	--	2	--	<1	<1	--	--	--	3	<1	--	4	<1	5	1	1	2
<i>Descurainia pinnata</i>	--	--	--	--	--	--	--	<1	1	1	--	3	--	--	--	<1	--	--	<1	<1	<1	<1	<1	--	--
<i>Lappula redowski</i>	--	--	<1	2	--	<1	--	--	--	--	--	--	--	--	--	--	--	--	<1	--	--	--	--	--	--
<i>Lepidium montanum</i>	--	--	--	--	6	--	--	--	6	--	--	--	--	--	--	--	--	--	--	--	--	--	8	--	--
<i>Penstemon</i> spp.	--	--	--	--	--	--	--	28	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Unknown mustard	42	--	--	--	12	--	--	--	--	--	--	--	--	--	--	--	3	--	--	--	--	--	--	--	--

Table 2.5.3-41

Oven dry weight (grams/m²) for Oldland Gulch Brush Beating Area. 1981

Species	Quadrat Numbers						
	1	2	3	8	14	15	22
<i>Agropyron cristatum</i>	17.24	19.67	27.98	0.80	18.96	-----	-----
<i>Agropyron smithii</i>	48.82	-----	24.31	12.04	25.34	11.57	24.38
<i>Agropyron trachycaulum</i>	-----	-----	-----	-----	-----	-----	-----
<i>Bromus tectorum</i>	9.11	13.49	1.33	0.85	0.42	0.59	0.87
<i>Elymus cinereus</i>	-----	-----	-----	-----	-----	-----	28.31
<i>Elymus junceus</i>	-----	14.80	11.10	-----	1.02	-----	-----
<i>Oryzopsis hymenoides</i>	-----	35.75	12.80	27.77	2.35	-----	46.85
<i>Poa</i> spp.	-----	-----	-----	-----	-----	-----	-----
<i>Sitanion hystrix</i>	-----	-----	-----	-----	0.5	-----	-----
<i>Sporobolus cryptandrus</i>	-----	-----	-----	-----	-----	-----	-----
<i>Lappa comata</i>	-----	-----	-----	33.62	-----	67.42	35.30
<i>Chenopodium</i> spp.	1.08	8.48	0.33	-----	-----	-----	1.26
<i>Descurainia pinnata</i>	-----	-----	-----	0.04	-----	-----	0.10
<i>Lappula redowski</i>	-----	-----	0.11	-----	-----	-----	-----
<i>Lepidium montanum</i>	-----	-----	-----	-----	-----	-----	-----
<i>Penstemon</i> spp.	-----	-----	-----	9.12	-----	-----	-----
Unknown mustard	26.43	-----	-----	-----	-----	-----	-----
TOTAL BIOMASS	99.68	92.19	77.96	89.24	48.59	79.58	137.07

Table 2.5.3-42

Regression equations for converting fresh weight estimates for Oldland Gulch Brush Beating Area. 1981.

Species	Regression Equation	Correlation Coefficient
<i>Agropyron cristatum</i>	$y = 0.46 x + 1.51$	0.90
<i>Agropyron smithii</i>	$y = 0.48 x + 3.04$	0.96
<i>Agropyron trachycaulum</i>	**	
<i>Bromus tectorum</i>	$y = 1.15 x - 0.51$	0.95
<i>Elymus junceus</i>	$y = 0.51 x - 0.60$	0.97
<i>Oryzopsis hymenoides</i>	$y = 0.74 x - 4.66$	0.95
<i>Poa</i> spp.	*	
<i>Sitanion hystrix</i>	**	
<i>Sporobolus cryptandrus</i>	**	
<i>Stipa comata</i>	$y = 0.84 x - 7.10$	0.87
<i>Chenopodium</i> spp.	$y = 0.42 x - 1.11$	0.98
<i>Descurainia pinnata</i>	***	
<i>Lappula redowski</i>	***	
<i>Lepidium montanum</i>	***	
Unknown mustard	***	

* Insufficient data, used equation for *Bromus tectorum*.** Insufficient data, used equation for *Elymus junceus*.*** Insufficient data, used equation for *Chenopodium* spp.

Table 2.5.3-43

Mean Production \pm the standard error of the mean (S. E.), frequency, and range of observed values for quadrats in Oldland Gulch Brush Beating Area, 1981. Based on data derived from regression equations. Production values in grams/m².

Species	Mean \pm S. E.	Sample Size	Frequency (%)	Range of Values
<i>Agropyron cristatum</i>	6.04 \pm 1.90	25	48	0-34.17
<i>Agropyron smithii</i>	26.64 \pm 3.40	25	92	0-56.80
<i>Agropyron trachycaulum</i>	2.68 \pm 1.46	25	16	0-31.54
<i>Bromus tectorum</i>	3.20 \pm 1.10	25	88	0-16.74
<i>Elymus junceus</i>	1.40 \pm 0.75	25	16	0-15.72
<i>Elymus cinerius</i>	1.13 \pm 1.13	25	4	0-28.31
<i>Oryzopsis hymenoides</i>	10.10 \pm 3.00	25	52	0-41.96
<i>Poa</i> spp.	0.16 \pm 0.16	25	4	0-4.09
<i>Sitanion hystrix</i>	0.09 \pm 0.07	25	8	0-1.95
<i>Sporobolus cryptandrus</i>	0.01 \pm 0.01	25	4	0-0.42
<i>Stipa comata</i>	13.50 \pm 4.70	25	44	0-71.86
<i>henopodium</i> spp.	0.70 \pm 0.30	25	64	0-8.13
<i>Sescurainia pinnata</i>	0.05 \pm 0.02	25	40	0-0.42
<i>Lappula redowski</i>	0.03 \pm 0.03	25	16	0-0.84
<i>Lepidium montanum</i>	0.20 \pm 0.10	25	12	0-2.25
<i>Penstemon</i> spp.	0.36 \pm 0.36	25	4	0-9.12
Unknown mustard	0.82 \pm 0.61	25	12	0-16.53
TOTAL	63.07 \pm 4.61	25		16.60-110.62

Table 2.5.3-44

Fresh weight estimates (grams) for Gardenhire Gulch Brush Beating. 1981

Quadrat Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
<i>Agropyron Cristatum</i>	22	---	---	---	---	---	---	3	---	---	10	13	1	---	---	---	---	---	---	---	---	15	5	28	
<i>Agropyron smithii</i>	15	---	103	60	4	9	93	---	9	---	11	---	48	73	64	---	75	13	---	62	7	32	51	20	10
<i>Agropyron trachycaulum</i>	---	---	---	11	6	---	---	---	67	---	---	---	---	---	---	---	---	65	---	---	---	---	---	---	---
<i>Bouteloua gracilis</i>	3	---	---	---	---	2	8	---	---	---	---	---	38	---	---	---	---	---	---	---	---	3	---	4	
<i>Bromus inermis</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
<i>Bromus tectorum</i>	16	---	2	1	2	1	2	48	1	21	13	113	7	5	3	29	2	1	42	2	33	21	3	11	20
<i>Elymus cinereus</i>	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	116	---	---	---	---	---	---
<i>Elymus junceus</i>	---	---	---	---	---	---	---	---	---	---	24	---	---	---	---	---	---	---	---	---	---	---	---	14	
<i>Oryzopsis hymenoides</i>	34	15	---	8	---	---	---	10	9	---	14	---	---	---	11	---	---	---	14	---	16	2	12	45	9
<i>Sitanion hystrix</i>	8	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	5	---	---	---	---
<i>Sporobolus cryptandrus</i>	---	29	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	7	---	---	5	6	---
<i>Stipa comata</i>	21	104	---	75	68	84	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Table 2.5.3-45 Fresh weight estimates (grams) for Gardenhire Gulch Brush Beating. 1981

Quadrat Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	
Unknown mustard	--	--	--	--	--	--	--	--	--	10	--	--	--	7	--	--	--	--	5	--	6	--	--	--	--	--
<i>Chenopodium</i> <i>spp.</i>	2	2	<1	--	--	<1	1	2	--	--	4	--	5	4	--	15	1	1	49	18	22	6	2	1	4	
<i>Kochia</i> <i>spp.</i>	13	3	--	--	--	--	--	14	--	--	21	--	2	--	--	--	--	<1	14	1	--	--	--	--	--	
<i>Euphorbia</i> <i>spp.</i>	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2	--	--	--	--	1	--	--	--	--	
<i>Lappula</i> <i>redowski</i>	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<1	--	--	--	--	--	--	--	--	--	--	
<i>Melilotus</i> <i>spp.</i>	--	--	--	--	--	--	--	6	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	1	
<i>Salsolea</i> <i>iberia</i>	52	3	<1	--	--	--	1	11	1	--	8	8	2	<1	--	12	1	1	47	--	20	1	1	--	<1	

Table 2.5.3-46

Oven dry weight (grams/m²) for Gardenhire Gulch Brush Beating Area. 1981

Species	Quadrat Numbers						
	1	2	3	4	12	13	19
<i>Agropyron cristatum</i>	13.63	-----	-----	-----	8.60	0.21	-----
<i>Agropyron smithii</i>	9.45	-----	60.66	39.31	-----	44.11	-----
<i>Agropyron trachycaulum</i>	-----	-----	-----	3.49	-----	-----	-----
<i>Bouteloua gracilis</i>	1.84	-----	-----	-----	-----	30.66	-----
<i>Bromus inermis</i>	-----	-----	-----	-----	-----	-----	-----
<i>Bromus tectorum</i>	16.59	-----	1.09	0.96	100.02	11.64	61.98
<i>Elymus cinereus</i>	-----	-----	-----	-----	-----	-----	77.00
<i>Elymus junceus</i>	-----	-----	-----	-----	-----	-----	-----
<i>Oryzopsis hymenoides</i>	25.49	3.51	-----	7.06	-----	-----	8.27
<i>Sitanion hystrix</i>	6.18	-----	-----	-----	-----	-----	-----
<i>Sporobolus cryptandrus</i>	-----	7.07	-----	-----	-----	-----	-----
<i>Stipa comata</i>	10.66	58.87	-----	37.34	-----	-----	-----
<i>Chenopodium</i> spp.	0.44	0.41	0.02	-----	-----	2.05	15.07
<i>Kochia</i> spp.	4.50	0.72	-----	-----	-----	0.20	7.56
<i>Euphorbia</i> spp.	-----	-----	-----	-----	-----	-----	-----
<i>Lappula redowski</i>	-----	-----	-----	-----	-----	-----	-----
<i>Melilotus</i> spp.	-----	-----	-----	-----	-----	0.14	-----
<i>Salsoa iberica</i>	18.89	0.36	0.04	-----	1.64	0.46	10.37
Unknown mustard	-----	-----	-----	-----	-----	-----	1.56
TOTAL BIOMASS	107.67	70.94	61.81	88.16	110.26	89.47	181.81

Table 2.5.3-47 Regression equations used for converting fresh weight estimates to oven dry weights for Gardenhire Gulch Brush Beating Area. 1981.

Species	Regression Equation	Correlation Coefficient
<i>Agropyron cristatum</i>	$y = 0.64 x - 0.23$	0.99
<i>Agropyron smithii</i>	$y = 0.55 x + 7.19$	0.94
<i>Agropyron trachycaulum</i>	*	
<i>Bouteloua gracilis</i>	$y = 0.82 x - 0.63$	1.00
<i>Bromus tectorum</i>	$y = 0.90 x + 4.86$	0.97
<i>Elymus junceus</i>	*	
<i>Oryzopsis hymenoides</i>	$y = 0.80 x - 3.12$	0.92
<i>Sitanion hystrix</i>	*	
<i>Sporobolus cryptandrus</i>	*	
<i>Stipa comata</i>	$y = 0.59 x - 2.37$	0.99
<i>Chenopodium</i> spp.	$y = 0.31 x - 0.08$	0.99
<i>Kochia</i> spp.	$y = 0.52 x - 0.89$	0.95
<i>Euphorbia</i> spp.	**	
<i>Melilotus</i> spp.	**	
<i>Salsoa iberica</i>	$y = 0.37 x + 0.30$	0.90
Unknown mustard	**	

* Insufficient data, used equation for *Agropyron cristatum*.

** Insufficient data, used equation for *Salsoa iberica*.

Table 2.5.3-48 Fresh weight estimates (grams) for Control plots of Brush beating Area. 1981

Quadrat Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
<i>Agropyron smithii</i>	52	--	24	1	31	--	--	8	--	--	21	--	24	18	9	44	34	5	39	23	20	35	22	--	62
<i>Agrapyron trachycaulum</i>	--	--	10	--	--	--	--	--	--	--	--	--	10	--	--	--	--	--	--	8	--	--	--	--	--
<i>Bouteloua gracilis</i>	--	14	--	--	--	4	--	--	2	5	11	8	2	--	--	--	--	--	2	--	--	--	--	--	4
<i>Bromus tectorum</i>	--	2	2	<1	<1	1	1	--	<1	6	4	5	8	2	11	--	--	<1	--	--	--	--	<1	1	<1
<i>Oryzopsis hymenoides</i>	--	<1	--	4	--	--	--	--	2	40	--	22	--	13	--	--	--	--	--	--	18	33	--	7	11
<i>Sitanion hystrix</i>	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3	--	--	--	--	--	--
<i>Sporobolus cryptandrus</i>	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5	--
<i>Stipa comata</i>	10	1	--	--	23	67	42	5	15	--	--	--	--	--	21	20	8	19	--	28	28	--	--	--	10
<i>Artemesia ludoviciana</i>	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2	--	--	--
<i>Aster spp.</i>	--	--	--	--	--	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--
<i>Chenopodium spp.</i>	--	--	1	--	--	--	--	--	--	<1	--	--	--	8	4	--	--	<1	--	--	--	--	--	--	--
<i>Descuriana pinnata</i>	--	--	<1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
<i>Lappula redowski</i>	--	--	<1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
<i>Lepidium montanum</i>	--	--	--	5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
<i>Penstemon spp.</i>	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2	--	--
<i>Sphaeralcea coccinea</i>	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5	--	--	--	--	2	--	--	--
Unknown mustard	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2	--	--	--	--	2	3	--	--	--

Table 2.5.3-49

Mean production \pm the standard error of the mean (S. E.), frequency, and range of observed values for quadrats in Gardenhire Gulch Brush Beating Area, 1981. Based on data derived from regression equations. Production values in grams/meter².

Species	Mean \pm S. E.	Sample Size	Frequency (%)	Range of Values
<i>Agropyron cristatum</i>	2.41 \pm 0.97	25	32	0-17.69
<i>Agropyron smithii</i>	22.16 \pm 3.88	25	76	0-63.84
<i>Agropyron trachycaulum</i>	2.07 \pm 1.66	25	12	0-41.37
<i>Bouteloua gracilis</i>	1.75 \pm 1.20	25	24	0-30.53
<i>Bromus tectorum</i>	19.02 \pm 4.42	25	96	0-48.06
<i>Elymus cinerius</i>	3.08 \pm 3.08	25	4	0-77.00
<i>Elymus junceus</i>	1.79 \pm 1.05	25	8	0-15.13
<i>Oryzopsis hymenoides</i>	4.87 \pm 1.60	25	52	0-32.88
<i>Sitanion hystrix</i>	0.31 \pm 0.22	25	8	0-4.89
<i>Sporobolus cryptandrus</i>	1.17 \pm 0.75	25	16	0-18.33
<i>Stipa comata</i>	7.83 \pm 3.52	25	20	0-58.99
<i>Chenopodium</i> spp.	1.67 \pm 0.71	25	76	0-6.74
<i>Kochia</i> spp.	1.20 \pm 0.50	25	32	0-6.39
<i>Euphorbia</i> spp.	0.07 \pm 0.05	25	8	0-1.04
<i>Lappula redowski</i>	0.01 \pm 0.01	25	4	0-0.25
<i>Melilotus</i> spp.	0.15 \pm 0.03	25	12	0-2.52
<i>Salsoa iberica</i>	2.71 \pm 1.03	25	72	0-19.54
Unknown mustard	0.50 \pm 0.20	25	12	0-4.00
TOTAL	68.73 \pm 4.52			27.76-117.91

Table 2.5.3-50

Regression equations used for converting fresh weight estimates to oven dry weights for Brush Beating Control Area. 1981.

Species	Regression Equation	Correlation Coefficient
<i>Agropyron smithii</i>	$y = 0.58 x + 0.43$	0.66
<i>Agropyron trachycaulum</i>	*	
<i>Bouteloua gracilis</i>	$y = 0.77 x - 0.47$	0.98
<i>Bromus tectorum</i>	$y = 0.86 x - 0.15$	0.90
<i>Oryzopsis hymenoides</i>	$y = 0.71 x - 0.23$	0.98
<i>Sitanion hystrix</i>	*	
<i>Sporobolus cryptandrus</i>	*	
<i>Stipa comata</i>	$y = 0.48 x - 0.18$	0.99
<i>Aster</i> spp.	**	
<i>Chenopodium</i> spp.	**	
<i>Sphaeralcea coccinea</i>	**	
Unknown mustard	$y = 0.72 x - 0.78$	

* Insufficient data, used equation for *Agropyron smithii*.

** Insufficient data, used equation for Unknown mustard.

Table 2.5.3-51

Mean production \pm the standard error of the mean (S. E.), frequency, and range of observed values for quadrats in Control Area (for comparison to Brush Beating Areas), 1981. Based on data derived from regression equations. Production values in grams/m².

Species	Mean \pm S. E.	Sample Size	Frequency (%)	Range of Values
<i>Agropyron smithii</i>	11.26 \pm 2.12	25	72	0-36.39
<i>Agropyron trachycaulum</i>	0.70 \pm 0.40	25	12	0-6.23
<i>Bouteloua gracilis</i>	1.43 \pm 0.50	25	36	0-10.31
<i>Bromus tectorum</i>	1.43 \pm 0.49	25	68	0-9.31
<i>Oryzopsis hymenoides</i>	3.83 \pm 1.50	25	40	0-28.17
<i>Sitanion hystrix</i>	0.08 \pm 0.08	25	4	0-2.17
<i>Sporobolus cryptandrus</i>	0.13 \pm 0.13	25	4	0-3.33
<i>Stipa comata</i>	5.60 \pm 1.50	25	56	0-31.98
<i>Artemesia ludoviciana</i>	0.02 \pm 0.02	25	4	0-0.45
<i>Aster</i> spp.	0.31 \pm 0.22	25	8	0-4.32
<i>Chenopodium</i> spp.	0.37 \pm 0.21	25	20	0-4.98
<i>Descuriana pinnata</i>	0.01 \pm 0.01	25	4	0-0.25
<i>Lappula redowski</i>	0.01 \pm 0.01	25	4	0-0.25
<i>Lepidium montanum</i>	0.11 \pm 0.11	25	4	0-2.82
<i>Penstemon</i> spp.	0.03 \pm 0.03	25	4	0-0.66
<i>Sphaeralcea coccinea</i>	0.14 \pm 0.11	25	8	0-3.48
Unknown mustard	0.11 \pm 0.06	25	12	0-1.38
TOTAL	25.41 \pm 2.65	25		1.33-51.29

Table 2.5.3-52 Adjusted weights for Control Plots. 1981 Data (Cont'd)

Quadrat Number	14	15	16	17	18	19	20	21	22	23	24	25
<i>Agropyron smithii</i>	10.87	5.65	25.95	20.15	3.33	23.05	13.77	12.03	20.73	13.19	-----	36.39
<i>Agropyron trachycaulum</i>	-----	-----	-----	-----	-----	-----	5.07	-----	-----	-----	-----	-----
<i>Bouteloua gracilis</i>	-----	-----	-----	-----	-----	1.07	-----	-----	-----	-----	-----	2.61
<i>Bromus tectorum</i>	1.57	9.31	-----	-----	0.09	-----	-----	-----	-----	0.09	0.71	0.09
<i>Oryzopsis hymenoides</i>	15.39	-----	-----	-----	-----	-----	-----	12.55	23.20	-----	4.74	7.58
<i>Sitanion hystrix</i>	-----	-----	-----	-----	-----	2.17	-----	-----	-----	-----	-----	-----
<i>Sporobolus cryptandrus</i>	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	3.33	-----
<i>Stipa comata</i>	-----	9.90	9.42	3.66	8.94	-----	13.26	13.26	-----	-----	-----	4.62
<i>Artemisia ludoviciana</i>	-----	-----	-----	-----	-----	-----	-----	-----	0.45	-----	-----	-----
<i>Aster spp.</i>	-----	-----	-----	-----	-----	-----	-----	4.32	-----	-----	-----	-----
<i>Chenopodium spp.</i>	4.98	2.10	-----	-----	.72	-----	-----	-----	-----	-----	-----	-----
<i>Descuriana pinnata</i>	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
<i>Lappula redowski</i>	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
<i>Lepedium montanum</i>	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
<i>Penstemon spp.</i>	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.66	-----	-----
<i>Sphaenolcea coccinea</i>	-----	-----	-----	2.82	-----	-----	-----	-----	0.66	-----	-----	-----
Unknown mustard	-----	-----	0.66	-----	-----	-----	-----	0.66	1.38	-----	-----	-----
TOTAL	32.81	26.96	36.03	26.63	13.08	26.29	32.10	42.82	45.97	13.28	8.78	51.29

Table 2.5.3-53

Oven dry weight (grams/m²) for Control plots of Brush Beating Area. 1981

Species	Quadrat Numbers						
	1	2	7	10	13	16	22
<i>Agropyron smithii</i>	23.43	-----	-----	-----	12.71	37.40	17.98
<i>Agropyron trachycaulum</i>	-----	-----	-----	-----	5.37	-----	-----
<i>Bouteloua gracilis</i>	-----	10.00	-----	4.58	0.16	-----	-----
<i>Bromus tectorum</i>	-----	1.37	0.33	6.92	5.38	-----	-----
<i>Oryzopsis hymenoides</i>	-----	0.39	-----	30.61	-----	-----	19.95
<i>Sitanion hystrix</i>	-----	-----	-----	-----	-----	-----	-----
<i>Sporobolus cryptandrus</i>	-----	-----	-----	-----	-----	-----	-----
<i>Stipa comata</i>	3.47	0.41	19.46	-----	-----	10.80	-----
<i>Artemisia ludoviciana</i>	-----	-----	-----	-----	-----	-----	0.45
<i>Aster</i> spp.	-----	-----	-----	-----	-----	-----	-----
<i>Chenopodium</i> spp.	-----	-----	-----	-----	-----	-----	-----
<i>Descuriana pinnata</i>	-----	-----	-----	-----	-----	-----	-----
<i>Lappula redowski</i>	-----	-----	-----	-----	-----	-----	-----
<i>Lepidium montanum</i>	-----	-----	-----	-----	-----	-----	-----
<i>Penstemon</i> spp.	-----	-----	-----	-----	-----	-----	-----
<i>Sphaeralcea coccinea</i>	-----	-----	-----	-----	-----	-----	0.33
Unknown mustard	-----	-----	-----	-----	-----	0.66	1.38
TOTAL BIOMASS	26.90	12.17	19.79	42.11	23.62	48.86	40.09

Table 2.5.3-54

SAGEBRUSH OCULAR ESTIMATED - SUMMER 1981

CHAINED P-J HABITAT

Transect	Sample Size	Paces	Young	Mature	Decadent	Low	Medium	High	Density
01	50	-	19	31	-	35	15	-	5-2-3-4-0
04	50	-	17	32	1	47	2	1	2-1-3-3-1
07	50	-	13	37	-	40	10	-	8-4-3-6-5
09	50	-	4	34	12	17	24	9	11-6-6-9-8
17	50	-	18	32	-	40	10	-	8-2-3-1-4
18	50	-	14	35	1	30	17	3	1-1-8-3-1
20	50	-	5	45	-	20	28	2	3-3-5-1-1
21	50	-	11	39	-	38	11	1	10-8-1-5-0
23	50	-	5	45	-	37	13	-	1-4-2-8-6
25	50	-	4	44	2	26	21	3	4-11-0-1-1
30	50	-	2	48	-	20	30	-	3-4-1-4-4
31	50	-	16	34	-	42	8	-	1-6-3-7-10
32	50	-	11	38	1	30	19	1	2-3-4-4-6
<hr/>									
TOTAL	650	-	187	446	17	422	208	20	
PERCENT			28.8	68.6	2.6	64.9	32.0	3.1	

PINYON JUNIPER HABITAT

Transect	Sample Size	Paces	Young	Mature	Decadent	Low	Medium	High	Density
10	25	-	-	20	5	13	8	4	1-2-1
11	25	-	1	16	8	12	10	3	1-1-1
12	25	-	-	19	6	15	5	5	1-3-1
13	25	-	-	22	3	9	12	4	5-1-1
14	25	-	-	20	5	5	14	6	4-3-4
15	25	-	-	22	3	2	12	11	1-0-3
16	50	-	1	42	7	31	10	9	4-3-0-1-1
19	25	-	-	15	10	15	5	5	2-1-1
22	50	-	-	33	17	19	28	3	1-9-1-1-3
24	50	-	4	44	2	26	21	3	4-11-0-1-1
26	50	-	-	33	17	31	15	4	2-3-1-2-3
27	50	-	-	38	12	17	30	3	1-1-3-1-2
<hr/>									
TOTAL	425	-	6	324	95	195	170	60	
PERCENT			1.4	76.2	22.4	45.9	40.0	14.1	

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2.5.4 Threatened and Endangered Species

No additional studies were conducted during this reporting period.

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2.5.5 Revegetation

Study results for 1981 will appear in the next data report.

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2.5.6 Soil Survey and Productivity Assessment

No additional studies were conducted during this report period.

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2.5.7 Dendrochronology and Dendroclimatology Studies

No additional studies were conducted during this report period.

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2.6 Archaeological Studies

No additional studies were conducted during this report period.

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2.7 Industrial Health and Safety

Periodic reports on Health and Safety Activities have been requested by the Deputy Conservation Manager. Accident Frequency and Mine Gas Monitoring summaries for this reporting period (June 1981 - October 1981) are presented in this section.

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2.7.1 Accident Frequency

Data presented in this section are provided by the Health and Safety Department. Table 2.7.1-1 presents the basic man hours, accident and injury rate data for the period from January, 1980 through May 1981. MSHA inspection reports and citations are on file and are available upon request.

Table 2.7.1-1

1980	OCCIDENTAL										CONTRACTOR										OXY & CONTR.									
	MAN HOURS					ACCIDENTS					I.R.					MAN HOURS					ACCIDENTS					I.R.				
	MONTH	Y.T.D.	QTR.	mon RA	yld RA	mon LTA	yld LTA	mon IR	yld IR	I.R.	MONTH	Y.T.D.	QTR.	mon RA	yld RA	mon LTA	yld LTA	mon IR	yld IR	I.R.	MONTH	Y.T.D.	QTR.	mon RA	yld RA	mon LTA	yld LTA	mon IR	yld IR	I.R.
JAN.	16,835	16,835		0	0	0	0	0	0	0	48,050.5	48,050.5		2	2	2	2	2	2	2	8,328.3	264,835.5	64,835.5	2	2	2	2	2	2	6,161.6
FEB.	18,049.5	34,884.5		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	66,451	131,336.5		2	4	2	4	2	4	6,021.09
MAR	17,643.5	52,528		1	1	1	1	1	1	1	50,744	147,196		3	7	3	7	3	7	3	11829.5	163,387.5	199,724	4	3	4	8	3	4	11703.01
APR	18,550	71,078		0	1	0	1	0	281	59,981	207,177		3	10	3	10	3	10	3	10	78,531	273,255		3	11					7,647.91
MAY	17,036	38,164		0	1	0	1	0	227	637,219	259,629.5		2	9	2	9	2	9	2	9	69,538.5	347,793.5		3	14					2,532.05
JUN	23,907.5	112,071.5		0	1	0	1	0	178	49,349.5	308,979		3	16	2	15	2	15	2	15	73,257	421,050.5		3	17					849,808
JUL	16,404.5	128,476		0	1	0	1	0	156	72,478	381,457		4	20	1	16	1	16	1	104988	882.5	509,933		4	21	1				900,824
AUG	17,640.5	146,116.5		0	1	0	1	0	137	66,982	448,439		2	22	2	18	2	18	2	5,979.81	84,622.5		2	23						473,774
SEP	17,604	163,795		0	1	0	1	0	122	72,012	520,451		3	25	3	21	3	21	3	833961	89,616	684,171.5		3	26					670,760
OCT	25,141	188,860.5	51,649	0	1	0	1	0	106	54,429	574,880		6	31	6	31	6	31	6	22051028	79,570	763,7415		6	32					1508838
NOV																														
DEC																														

IR = Injury Rate
RA = Reported Accidents
LTA = Lost Time Accidents

G = Grand Junction
0 = Occidental

2.7.2 Mine Gas Monitoring

Mine gas samples are required at least once every 24 hours from the exhaust air of each shaft. Table 2.7.2-1 presents weekly summarized data for methane gas analysis taken from the Ventilation/Escape and Production/Service Shafts.

TABLE 2.7.2-1

V/E AND PRODUCTION/SERVICE SHAFTS
GAS ANALYSIS WEEKLY SUMMARY

DATE	V/E Shaft	Production/Service Shaft
1/05/81 - 1/09/81	.103%	.008%
1/09/81 - 1/15/81	.115	.003
1/22/81 - 1/29/81	.083	.013
1/30/81 - 2/05/81	.1	0
2/06/81 - 2/12/81	.065	.015
2/12/81 - 2/17/81	.082	.020
2/19/81 - 2/25/81	.093	.011
2/26/81 - 3/04/81	.088	.020
3/05/81 - 3/10/81	.104	.019
3/11/81 - 3/18/81	.104	.003
3/20/81 - 3/26/81	.099	.001
3/26/81 - 4/01/81	.108	.002
4/03/81 - 4/08/81	.089	0
4/08/81 - 4/14/81	.107	.003
4/15/81 - 4/22/81	.106	.002
4/23/81 - 4/28/81	.090	.007
4/30/81 - 5/06/81	.099	.008
5/07/81 - 5/13/81	.111	0
5/14/81 - 5/19/81	.088	.002
5/20/81 - 5/27/81	.077	.006
5/28/81 - 6/03/81	.107	.007
6/18/81 - 6/23/81	.099	.024
7/01/81 - 7/07/81	.111	0
7/08/81 - 7/15/81	.114	0
7/16/81 - 7/21/81	.118	0
7/22/81 - 7/29/81	.11	0
8/06/81 - 8/12/81	0	0
8/13/81 - 8/19/81	0	0
8/20/81 - 8/26/81	.1	0
9/17/81 - 9/23/81	0	0
9/24/81 - 9/30/81	.04	0
10/01/81 - 10/07/81	.04 to .03	0
10/08/81 - 10/14/81	.03	0
10/15/81 - 10/21/81	0	0
10/23/81 - 10/28/81	0	0
10/29/81 - 11/03/81	0	0
11/05/81 - 11/11/81	0	0
11/12/81 - 11/19/81	0	0
11/19/81 - 11/25/81	0	0

3.0 Other Studies

Data were collected in two of the programs within the Other Studies category for period June, 1981 through October, 1981. These programs were: Micro-environmental Studies and Traffic Load Studies. The remaining programs in the Other Studies category were inactive during this report period.

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3.1 Fish and Wildlife Management Plan

No additional studies were made during this report period.

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3.2 Micro-Climate Program

Introduction

Micro-climatic parameters for June, 1981 - November, 1981 include the following: Maximum and minimum temperature at surface and at one meter (Table 3.2-1). Totals for precipitation, snow depth and snow moisture, (Table 3.2-2).

Scope

Studies of micro-climatic parameters on the C-b Tract provide data that are useful in assessing changes in vegetation production and structure, animal populations, or animal activity patterns, and may also be correlated with changes in functional components of the C-b ecosystem that may occur as a result of shale oil development. Five micro-climatic stations are located in developmental sites and five in control sites:

The following sites are monitored:

MC Station Locations

- BC01 Chained Pinyon-Juniper Rangeland, Veg. Plot 1
- BC02 Chained Pinyon-Juniper Rangeland, Veg. Plot 2
- BC03 Plateau Sagebrush, Veg. Plot 3
- BC04 Valley Bottom Sagebrush, Veg. Plot 4
- BC05 Pinyon-Juniper Woodland, Veg. Plot 5
- BC06 Pinyon-Juniper Woodland, Veg. Plot 6
- BC07 Chained Pinyon-Juniper Rangeland
(Animal Trapping Transect)
- BC08 Bunchgrass Community, South-facing Slope
- BC09 Valley Bottom Sagebrush, Mouth of Sorghum Gulch
- BC13 Mixed Mountain Shrubland, North-facing Slope

Temperature readings consist of maximum and minimum readings for two-week periods. Precipitation is measured only during the growing season, March through October. Therefore, precipitation data from meteorology stations AB20 and AB23 are utilized for winter-month readings (November-February) for valley and pinyon-juniper microclimate stations. Snow measurements are obtained approximately from November-February.

Table 3.2-1

MICROCLIMATE DATA

AIR SURFACE TEMPERATURES OF MAXIMUM AND MINIMUM VALUES *

JUNE 1981 - NOVEMBER 1981

STATION	YEAR	MONTH	DAY	TEMP MAXIMUM	TEMP MINIMUM	SURFACE TEMP MAXIMUM	SURFACE TEMP MINIMUM
BC01	81	6	15	16.0	-4.0	33.0	-5.0
			30	29.0	4.0	42.0	-4.0
		7	16	29.0	7.0	43.0	-5.0
			31	34.0	3.0	39.0	-2.5
		8	14	24.0	6.0	44.0	3.0
			9	1	28.0	7.0	39.0
		10	15	26.0	4.0	36.0	2.0
			1	22.0	2.0	33.0	3.0
		11	16	10.0	-2.0	30.0	-3.0
			2	12.0	-13.0	20.0	-11.0
		BC02	81	6	16	16.0	-5.0
30	2.0				-19.0	20.0	-20.0
7	15			21.0	-5.0	37.0	-7.0
	30			34.0	8.0	42.0	-5.0
8	16			33.0	9.0	41.0	4.0
	31			37.0	7.8	39.5	.5
9	14			36.0	5.0	42.0	4.0
	1			28.0	6.0	26.0	6.0
10	15			28.0	3.0	34.0	2.0
	1			25.0	-2.0	26.0	-3.0
BC03	81			6	15	31.0	-2.0
		30	35.0		-9.0	46.0	6.0
		7	16	36.0	10.0	47.0	12.0
			8	14	35.0	9.0	46.0
		9	1	37.0	8.0	44.0	12.0
			15	30.0	2.0	41.0	-1.0
		10	1	22.0	8.0	40.0	4.0
			16	20.0	-1.0	36.0	-2.0
		11	2	3.0	-9.0	26.0	-6.0
			16	17.0	-12.0	26.0	.0
		BC04	81	6	30	10.0	-11.0
15	34.0				-7.0	39.0	-5.0
7	30			37.0	-5.0	47.0	-2.0
	16			38.0	4.0	42.0	6.0
8	31			36.5	1.5	42.0	3.5
	14			38.0	3.0	43.0	5.0
9	1			36.0	2.0	38.0	4.0
	15			32.0	1.0	35.0	2.0
10	1			30.0	-5.0	31.0	-3.0
	16			27.0	-5.0	28.0	-1.0
11	2			18.0	-16.0	20.0	-12.0

* Temperature values reported in °C

Table 3.2-1 (continued)

MICROCLIMATE DATA

AIR SURFACE TEMPERATURES OF MAXIMUM AND MINIMUM VALUES*

JUNE 1981 - NOVEMBER 1981

STATION	YEAR	MONTH	DAY	TEMP MAXIMUM	TEMP MINIMUM	SURFACE TEMP MAXIMUM	SURFACE TEMP MINIMUM
BC04	81	11	16	22.0	-9.0	21.0	-7.0
			30	19.0	-20.0	18.0	-23.0
BC05	81	6	15	35.0	14.0	38.0	-2.0
			30	34.0	-4.0	37.0	1.0
		7	16	33.0	5.0	42.0	8.0
			31	36.5	1.8	34.0	6.0
		8	14	34.0	4.0	42.0	2.0
		9	1	31.0	4.0	34.0	9.0
			15	27.0	2.0	30.0	5.0
		10	1	22.0	-4.0	25.0	1.0
			16	18.0	-4.0	22.0	.0
		11	2	12.0	-15.0	16.0	-10.0
			16	15.0	1.0	18.0	2.0
BC06	81	6	30	14.0	-8.0	17.0	-16.0
			15	32.0	-7.0	38.0	-1.0
			30	35.0	20.0	39.0	4.0
		7	16	37.0	5.0	42.0	10.0
			31	40.0	-1.0	36.0	1.5
		8	14	36.0	3.0	42.0	7.0
		9	1	32.4	4.0	35.0	10.0
			15	30.0	1.0	34.0	1.0
		10	1	30.0	.0	26.0	-5.0
			16	24.0	.0	27.0	-1.0
		11	2	15.0	-16.0	19.0	-12.0
			16	15.0	-8.0	18.0	-3.0
BC07	81		30	15.0	-20.0	17.0	-17.0
		6	15	19.0	-6.0	35.0	-6.0
			30	33.0	3.0	35.0	2.0
		7	16	35.0	5.0	39.0	3.0
			31	32.0	.5	41.5	3.0
		8	14	30.0	4.0	39.0	3.0
		9	1	26.0	4.0	34.0	6.0
			15	29.0	2.0	32.0	1.0
		10	1	24.0	-3.0	32.0	-5.0
			16	13.0	-1.0	28.0	-4.0
		11	2	21.0	-16.0	21.0	-13.0
			16	13.0	-6.0	19.0	-9.0
BC08	81		30	10.0	-20.0	18.0	-22.0
		6	15	30.0	-3.0	29.0	2.0
			30	36.0	.0	37.0	12.0
		7	16	35.0	8.0	38.0	13.0

* Temperature values reported in °C

Table 3.2-1 (continued)

MICROCLIMATE DATA

AIR SURFACE TEMPERATURES OF MAXIMUM AND MINIMUM VALUES*

JUNE 1981 - NOVEMBER 1981

STATION	YEAR	MONTH	DAY	TEMP MAXIMUM	TEMP MINIMUM	SURFACE TEMP MAXIMUM	SURFACE TEMP MINIMUM		
BC08	81	7	31	34.5	5.0	36.0	7.0		
		8	14	37.0	6.0	38.0	9.0		
		9	1	29.0	9.0	29.0	7.0		
			15	31.0	2.0	32.0	4.0		
		10	1	28.0	-1.0	33.0	3.0		
			16	24.0	-1.0	43.0	.0		
		11	2	21.0	-13.0	21.0	-14.0		
			16	21.0	-7.0	21.0	-9.0		
			30	20.0	-19.0	19.0	-18.0		
		BC09	81	6	15	32.0	-10.0	49.0	-6.0
					30	35.0	-8.0	43.0	-5.0
7	16			34.0	2.0	44.0	4.0		
	31			35.0	.0	44.0	2.0		
8	14			38.0	-3.0	46.0	.0		
9	1			33.0	.0	42.0	2.0		
	15			31.0	1.0	42.0	1.0		
10	1			30.0	-7.0	40.0	-5.0		
	16			24.0	-7.0	35.0	-2.0		
11	16			22.0	-11.0	27.0	-9.0		
	30			20.0	-27.0	26.0	-16.0		
BC13	81	6	15	32.0	-4.0	40.0	-3.0		
			30	31.0	5.0	38.0	6.0		
		7	16	31.0	14.0	43.0	7.0		
			31	33.0	5.0	41.8	.8		
		8	14	34.0	5.0	42.0	6.0		
		9	1	31.0	6.0	37.0	6.0		
			15	24.0	3.0	35.0	2.0		
		10	1	26.0	-2.0	34.0	-4.0		
			16	23.0	-3.0	27.0	-2.0		
		11	2	10.0	-2.0	18.0	-12.0		
			16	17.0	-6.0	16.0	-8.0		
	30	15.0	-20.0	15.0	-18.0				

* Temperature values reported in °C

Table 3.2-2

MICROCLIMATE DATA
PRECIPITATION VALUES

JUNE 1981 - NOVEMBER 1981

STATION	YEAR	MONTH	DAY	PRECIPITATION	(in)
BC01	81	6	15	.50	
			30	.60	
		7	16	.50	
			31	.50	
		8	14	.31	
			9	1	1.00
		10	15	.78	
			1	.70	
		11	16	3.05	
			2	.61	
		BC02	81	6	16
15	1.10				
7	30			.80	
	16			.74	
8	31			.80	
	14			.78	
9	1			.59	
	15			.49	
10	1			.40	
	16			3.05	
BC03	81			6	16
		15	.41		
		7	30	.82	
			16	.42	
		8	31	.73	
			14	.30	
		9	1	.70	
			15	1.00	
		10	1	.22	
			16	2.80	
		BC04	81	6	16
15	.50				
7	30			.88	
	16			.52	
8	31			.81	
	14			.36	
9	1			.81	
	15			.80	
10	1			.41	
	16			3.00	
BC05	81			6	16
		15	.50		
		7	30	.88	
			16	.52	
		8	31	.81	
			14	.36	
		9	1	.81	
			15	.80	
		10	1	.41	
			16	3.00	
		BC06	81	6	16
15	.50				
7	30			.88	
	16			.52	
8	31			.81	
	14			.36	
9	1			.81	
	15			.80	
10	1			.41	
	16			3.00	
BC07	81			6	16
		15	.50		
		7	30	.88	
			16	.52	
		8	31	.81	
			14	.36	
		9	1	.81	
			15	.80	
		10	1	.41	
			16	3.00	
		BC08	81	6	16
15	.50				
7	30			.88	
	16			.52	
8	31			.81	
	14			.36	
9	1			.81	
	15			.80	
10	1			.41	
	16			3.00	
BC09	81			6	16
		15	.50		
		7	30	.88	
			16	.52	
		8	31	.81	
			14	.36	
		9	1	.81	
			15	.80	
		10	1	.41	
			16	3.00	
		BC10	81	6	16
15	.50				
7	30			.88	
	16			.52	
8	31			.81	
	14			.36	
9	1			.81	
	15			.80	
10	1			.41	
	16			3.00	
BC11	81			6	16
		15	.50		
		7	30	.88	
			16	.52	
		8	31	.81	
			14	.36	
		9	1	.81	
			15	.80	
		10	1	.41	
			16	3.00	
		BC12	81	6	16
15	.50				
7	30			.88	
	16			.52	
8	31			.81	
	14			.36	
9	1			.81	
	15			.80	
10	1			.41	
	16			3.00	
BC13	81			6	16
		15	.50		
		7	30	.88	
			16	.52	
		8	31	.81	
			14	.36	
		9	1	.81	
			15	.80	
		10	1	.41	
			16	3.00	
		BC14	81	6	16
15	.50				
7	30			.88	
	16			.52	
8	31			.81	
	14			.36	
9	1			.81	
	15			.80	
10	1			.41	
	16			3.00	
BC15	81			6	16
		15	.50		
		7	30	.88	
			16	.52	
		8	31	.81	
			14	.36	
		9	1	.81	
			15	.80	
		10	1	.41	
			16	3.00	
		BC16	81	6	16
15	.50				
7	30			.88	
	16			.52	
8	31			.81	
	14			.36	
9	1			.81	
	15			.80	
10	1			.41	
	16			3.00	
BC17	81			6	16
		15	.50		
		7	30	.88	
			16	.52	
		8	31	.81	
			14	.36	
		9	1	.81	
			15	.80	
		10	1	.41	
			16	3.00	
		BC18	81	6	16
15	.50				
7	30			.88	
	16			.52	
8	31			.81	
	14			.36	
9	1			.81	
	15			.80	
10	1			.41	
	16			3.00	
BC19	81			6	16
		15	.50		
		7	30	.88	
			16	.52	
		8	31	.81	
			14	.36	
		9	1	.81	
			15	.80	
		10	1	.41	
			16	3.00	
		BC20	81	6	16
15	.50				
7	30			.88	
	16			.52	
8	31			.81	
	14			.36	
9	1			.81	
	15			.80	
10	1			.41	
	16			3.00	
BC21	81			6	16
		15	.50		
		7	30	.88	
			16	.52	
		8	31	.81	
			14	.36	
		9	1	.81	
			15	.80	
		10	1	.41	
			16	3.00	
		BC22	81	6	16
15	.50				
7	30			.88	
	16			.52	
8	31			.81	
	14			.36	
9	1			.81	
	15			.80	
10	1			.41	
	16			3.00	
BC23	81			6	16
		15	.50		
		7	30	.88	
			16	.52	
		8	31	.81	
			14	.36	
		9	1	.81	
			15	.80	
		10	1	.41	
			16	3.00	
		BC24	81	6	16
15	.50				
7	30			.88	
	16			.52	
8	31			.81	
	14			.36	
9	1			.81	
	15			.80	
10	1			.41	
	16			3.00	
BC25	81			6	16
		15	.50		
		7	30	.88	
			16	.52	
		8	31	.81	
			14	.36	
		9	1	.81	
			15	.80	
		10	1	.41	
			16	3.00	
		BC26	81	6	16
15	.50				
7	30			.88	
	16			.52	
8	31			.81	
	14			.36	
9	1			.81	
	15			.80	
10	1			.41	
	16			3.00	
BC27	81			6	16
		15	.50		
		7	30	.88	
			16	.52	
		8	31	.81	
			14	.36	
		9	1	.81	
			15	.80	
		10	1	.41	
			16	3.00	
		BC28	81	6	16
15	.50				
7	30			.88	
	16			.52	
8	31			.81	
	14			.36	
9	1			.81	
	15			.80	
10	1			.41	
	16			3.00	
BC29	81			6	16
		15	.50		
		7	30	.88	
			16	.52	
		8	31	.81	
			14	.36	
		9	1	.81	
			15	.80	
		10	1	.41	
			16	3.00	
		BC30	81	6	16
15	.50				
7	30			.88	
	16			.52	
8	31			.81	
	14			.36	
9	1			.81	
	15			.80	
10	1			.41	
	16			3.00	
BC31	81			6	16
		15	.50		
		7	30	.88	
			16	.52	
		8	31	.81	
			14	.36	
		9	1	.81	
			15	.80	
		10	1	.41	
			16	3.00	
		BC32	81	6	16
15	.50				
7	30			.88	
	16			.52	
8	31			.81	
	14			.36	
9	1			.81	
	15			.80	
10	1			.41	
	16			3.00	
BC33	81			6	16
		15	.50		
		7	30	.88	
			16	.52	
		8	31	.81	
			14	.36	
		9	1	.81	
			15	.80	
		10	1	.41	
			16	3.00	
		BC34	81	6	16
15	.50				
7	30			.88	
	16			.52	
8	31			.81	
	14			.36	
9	1			.81	
	15			.80	
10	1			.41	
	16			3.00	
BC35	81			6	16
		15	.50		
		7	30	.88	
			16	.52	
		8	31	.81	
			14	.36	
		9	1	.81	
			15	.80	
		10	1	.41	
			16	3.00	
		BC36	81	6	16
15	.50				
7	30			.88	
	16			.52	
8	31			.81	
	14			.36	
9	1			.81	
	15			.80	
10	1			.41	
	16			3.00	
BC37	81			6	16
		15	.50		
		7	30	.88	
			16	.52	
		8	31	.81	
			14	.36	
		9	1	.81	
			15	.80	
		10	1	.41	
			16	3.00	
		BC38	81	6	16
15	.50				
7	30			.88	
	16			.52	
8	31			.81	
	14			.36	
9	1			.81	
	15			.80	
10	1			.41	
	16			3.00	
BC39	81			6	16
		15	.50		
		7	30	.88	
			16	.52	
		8	31	.81	
			14	.36	
		9	1	.81	
			15	.80	
		10	1	.41	
			16	3.00	
		BC40	81	6	16
15	.50				
7	30			.88	
	16			.52	
8	31			.81	
	14			.36	
9	1			.81	
	15			.80	
10	1			.41	
	16			3.00	
BC41	81			6	16
		15	.50		
		7	30	.88	
			16	.52	
		8	31	.81	
			14	.36	
		9	1	.81	
			15	.80	
		10	1	.41	
			16	3.00	
		BC42	81	6	16
15	.50				
7	30			.88	
	16			.52	
8	31			.81	
	14			.36	
9	1			.81	
	15			.80	
10	1			.41	
	16			3.00	
BC43	81			6	16
		15	.50		
		7	30	.88	
			16	.52	
		8	31	.81	
			14	.36	

Table 3.2-2 (continued)

MICROCLIMATE DATA

PRECIPITATION VALUES

JUNE 1981 - NOVEMBER 1981

STATION	YEAR	MONTH	DAY	PRECIPITATION (in)
BC04	81	11	16	.10
BC05	81	6	15	.30
			30	.36
		7	16	.30
			31	.23
		8	14	.23
		9	1	.38
			15	.50
		10	1	.70
			16	2.10
		11	2	.51
			16	.11
BC06	81	6	15	.38
			30	.50
		7	16	.44
			31	.49
		8	14	.24
		9	1	.80
			15	.79
		10	1	.43
			16	2.90
		11	2	.60
			16	.17
BC07	81	6	15	.33
			30	1.00
		7	16	.52
			31	.50
		8	14	.31
		9	1	.90
			15	.75
		10	1	.41
			16	2.70
		11	2	.63
			16	.16
BC08	81	6	15	.60
			30	.50
		7	16	.86
			31	.68
		8	14	.29
		9	1	1.00
			15	.38
		10	1	.23
			16	3.25

Table 3.2-2 (continued)

MICROCLIMATE DATA

PRECIPITATION VALUES

JUNE 1981 - NOVEMBER 1981

STATION	YEAR	MONTH	DAY	PRECIPITATION (in)
BC08	81	11	2	.69
			16	.15
BC09	81	6	15	.15
			30	.40
		7	16	.36
			31	.40
		8	14	.22
		9	1	.56
			15	.40
		10	1	.50
			16	1.80
		11	2	.23
			16	.00
BC13	81	6	15	1.00
			30	.96
		7	16	.46
			31	.71
		8	14	.28
		9	1	.90
			15	.90
		10	1	.21
			16	3.05
		11	2	.90
			16	.16

Table 3.2-2 (continued)

MICROCLIMATE DATA

SNOW DEPTH AND SNOW MOISTURE VALUES

JUNE 1981 - NOVEMBER 1981

STATION	YEAR	MONTH	DAY	SNOW DEPTH	SNOW MOISTURE
-----	----	----	---	-----	-----
RC01	81	11	30	12.0 cm	2.0 cm
				12.0	1.0
				10.0	1.0
				11.0	1.0
				11.0	1.0
				11.2	1.2
RC02	81	11	30	12.0	2.0
				12.0	2.0
				12.0	2.0
				12.0	2.0
				9.0	2.0
				11.4	2.0
RC03	81	11	30	12.0	2.0
				14.0	1.0
				12.0	2.0
				13.0	2.0
				14.0	2.0
				13.0	1.8
RC04	81	11	30	10.0	2.0
				12.0	2.0
				12.0	2.0
				10.0	2.0
				10.0	2.0
				10.8	2.0
RC05	81	11	30	14.0	2.0
				12.0	2.0
				6.8	2.0
RC06	81	11	30	10.0	8.0
				12.0	8.0
				11.0	8.0
				10.0	8.0
				10.0	8.0
RC07	81	11	30	10.0	8.0
				10.0	4.0
				11.0	2.0
				11.0	3.0
				11.0	3.0
				17.0	3.0
				12.0	3.0
RC09	81	11	30	9.0	2.0
				10.0	1.0
				8.0	1.0
				9.0	2.0
				10.0	1.0
				9.2	1.4
RC13	81	11	30	15.0	2.0
				12.0	1.0
				12.0	2.0
				13.0	2.0
				14.0	2.0
				13.2	1.8

3.3 Scenic Values Study

No additional studies were conducted during this report period.

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3.4 Traffic Load

This section contains data relating to vehicular and passenger load along Piceance Creek road and into the C-b Oil Shale Tract.

Daily vehicle counts taken at the C-b Guard Shack are presented in Table 3.4-1. These data were broken down into counts of cars and trucks beginning in January 1980.

The C-b Shale Oil Project began providing regular bus service for employees to and from the C-b Tract on April 1, 1978. Table 3.4-2, summarizes bus passenger miles data for 1981.

A program of monitoring vehicular traffic was initiated in March, 1978. Counters were placed at three stations:

1. BT01 - Rio Blanco Store. Vehicles moving west on Piceance Creek Road are counted as "in"; vehicles moving east are counted as "out".
2. BT02 - Cattleguard on CB access road
3. BT03 - Rio Blanco Lake on Piceance Creek Road

These data are recorded onto paper tape; therefore, vehicle type (i.e. car or truck) is unknown. Table 3.4-3 presents a summary of the traffic data collected at the three stations for this report period.

Table 3.4-1

CATHEDRAL BLUFFS GUARD SHACK DAILY TRAFFIC COUNT - 1981

MONTH	DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
January	Car	12	56	51	43	89	80	81	94	98	34	41	88	106	118	112	96	49	58	73	114	118	121	142	75	52	112	143	92	82	72	31
	Truck	0	3	0	0	5	11	15	12	13	0	0	9	8	1	1	4	0	0	0	9	10	17	23	0	0	16	16	5	10	7	0
February	Car	40	106	60	96	95	109	38	39	92	85	87	97	110	59	31	83	117	134	150	106	52	45	110	148	157	126	131	105			
	Truck	0	11	13	14	6	8	0	0	6	1	4	8	4	7	0	2	4	10	10	4	0	0	17	0	6	4	6	0			
March	Car	48	94	114	106	101	118	25	44	91	122	85	101	92	56	43	119	98	106	114	112	48	27	112	137	129	89	97	33	43	78	85
	Truck	0	5	5	8	15	12	0	1	8	7	6	8	9	0	0	8	8	9	6	10	6	0	15	14	15	11	4	0	1	5	9
April	Car	100	111	117	32	46	89	104	111	120	118	88	52	118	123	124	194	71	52	41	116	139	129	104	112	52	38	124	111	106	135	
	Truck	8	12	13	7	1	14	13	9	4	5	0	0	7	3	3	15	3	0	0	0	6	7	2	4	9	10	21	6	11	21	
May	Car	138	47	52	88	132	112	124	106	50	38	115	148	127	109	111	53	39	131	139	113	116	100	43	36	23	107	120	159	138	38	46
	Truck	20	9	0	12	13	10	9	9	6	0	10	10	10	2	15	10	5	2	28	17	2	11	8	0	0	0	14	17	15	4	0
June	Car	109	105	126	136	48	202	41	117	152	121	132	152	47	46	240	145	165	116	112	56	57	111	132	145	159	157	56	41	136	139	
	Truck	16	17	16	13	0	10	0	6	9	9	11	9	1	1	8	4	22	8	6	0	0	5	2	2	5	11	1	0	10	12	
July	Car	141	142	65	20	26	171	172	157	126	166	70	35	150	170	175	121	142	57	45	113	136	137	115	140	53	46	135	154	178	151	150
	Truck	9	7	1	0	0	11	11	7	11	15	5	0	11	16	7	10	10	1	0	8	13	10	13	14	3	2	10	7	8	15	5
August	Car	44	36	131	159	92	150	188	56	47	151	175	150	140	198	57	37	142	120	146	142	145	64	45	133	135	176	175	165	56	23	148
	Truck	3	1	4	10	4	8	6	0	0	18	20	17	11	10	2	0	13	17	22	23	0	8	0	16	18	15	5	19	0	0	2
September	Car	82	167	197	177	33	37	18	148	177	149	164	61	36	163	171	158	177	200	109	67	163	184	189	67	156	56	17	131	175	181	
	Truck	8	6	7	10	0	0	0	9	16	8	9	0	0	5	13	14	10	22	0	1	21	18	17	15	14	1	0	4	15	9	
October	Car	142	174	65	42	143	157	169	112	147	53	21	114	119	145	136	138	46	24	163	173	141	180	168	37	28	164	173	172	138	131	28
	Truck	12	17	0	0	17	21	21	3	14	0	0	21	22	19	4	8	1	0	31	16	16	16	20	1	0	17	15	6	19	21	16
November	Car	28	157	168	187	137	149	34	25	137	139	157	119	184	30	21	135	62	144	145	168	40	61	157	161	180	16	37	27	28	101	
	Truck	1	30	20	28	16	4	0	0	9	13	13	20	3	0	1	8	11	10	28	17	0	0	21	38	8	0	0	0	0	18	
December	Car																															
	Truck																															

Table 3.4-2

BUS PASSENGER MILE REPORT SUMMARY 1980-1981

Page One

Month	No. Half Trips Rifle to C-B	No. Half Trips C-B to Rifle	No. Half Trips Meeker to C-B	No. Half Trips C-B to Meeker	Total Passengers	Cummulative Total Passengers	Total Passenger Miles	Cummulative Total Passenger Miles
Nov. 1980	163	163	93	93	7,933* 1,643	7,933 1,643	14,018 8,928	14,018 8,928
Dec. 1980	157	157	93	93	7,751 1,624	15,684 3,267	13,502 8,928	27,520 17,856
Jan. 1981	157	157	93	93	8,429 1,850	24,113 5,117	13,502 8,928	41,022 26,784
Feb. 1981	142	142	84	84	7,542 1,644	31,655 6,761	12,298 8,064	53,320 34,848
March 1981	160	160	93	93	8,320 1,691	39,975 8,452	13,760 8,928	67,080 43,776
April 1981	151	151	90	90	7,623 1,651	47,598 10,103	12,996 8,604	80,076 52,380
May 1981	152	152	93	93	6,980 1,721	54,578 11,824	13,072 8,838	93,148 61,218
June 1981	157	157	89	89	6,991 2,044	61,569 13,868	13,502 8,544	106,650 69,762
July 1981	170	170	108	108	7,674 2,950	69,243 16,818	11,301 14,654	117,951 84,416
August 1981	149	149	114	114	7,295 3,496	76,538 20,314	12,814 12,758	130,765 97,174
Sept. 1981	160	160	120	120	7,224 3,974	83,762 24,288	13,760 11,520	144,525 108,694

* Rifle (top)
Meeker (bottom)

Table 3.4-2 (continued)

BUS PASSENGER MILE REPORT SUMMARY 1980-1981

Page Two

Month	No. Half Trips Rifle to C-B	No. Half Trips C-B to Rifle	No. Half Trips Meeker to C-B	No. Half Trips C-B to Meeker	Total Passengers	Cummulative Total Passengers	Total Passenger Miles	Cummulative Total Passenger Miles
Oct. 1981	185	185	142	142	8,302* 5,456	92,064 29,744	15,910 13,584	160,435 122,278
Nov. 1981	187	187	146	146	8,185 5,124	100,249 34,868	15,996 14,016	176,431 136,294

* Rifle (top)
Meeker (bottom)

C-44 STEVENS RECORDER TRAFFIC COUNT
JUNE 1981 - NOVEMBER 1981

YEAR	MONTH	DAY	HOUR	LOCATION				BT02		BT03	
				BT01 IN	BT01 OUT	BT02 IN	BT02 OUT	BT03 IN	BT03 OUT		
81	6	9	15	0	0	0	3	0	0	0	
			16	0	5	50	4	0	4		
		17		35	6	11	2	17	4		
			18	28	2	12	2	18	3		
			19	17	2	12	1	9	1		
	7	20	3	6	1	1	1	3			
		21	6	9	0	0	3	1			
		22	1	9	1	13	2	3			
		23	2	3	1	0	4	1			
		24	14	0	17	0	4	1			
	10	1	5	0	0	0	1	0			
		2	0	1	0	0	0	0			
		3	0	0	0	0	0	0			
		4	1	0	1	0	0	0			
		5	0	14	0	0	0	2			

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C-4 STEVEN'S RECORDER TRAFFIC COUNT
JUNE 1981 - NOVEMBER 1981

YEAR	MONTH	DAY	LOCATION				HT02		HT03	
			HT01 IN	TRAFFIC	OUT	TRAFFIC	IN	OUT	IN	OUT
YEAR	MONTH	DAY	HT01 IN	TRAFFIC	OUT	TRAFFIC	IN	OUT	IN	OUT
81	6	10	0	58			1	50	1	16
		7	2	23			5	12	0	18
		8	13	18			13	3	5	13
		9	12	18			7	14	7	9
		10	7	19			2	13	2	5
		11	7	11			5	5	12	6
		12	18	7			12	7	9	4
		13	9	17			6	8	8	8
		14	9	20			8	26	9	14
		15	21	11			13	3	4	5
		16	59	11			53	5	12	3
		17	34	2			12	1	16	3
		18	28	6			12	1	18	0
		19	13	3			9	1	4	1

C-H STEVENS RECORDER TRAFFIC COUNT
JUNE 1981 - NOVEMBER 1981

YEAR	MONTH	DAY	HOUR	LOCATION		H102		H103	
				IN	OUT	IN	OUT	IN	OUT
1981	6	10	20	5	1	3	0	4	0
		21		1	4	0	0	0	2
		22		3	10	1	6	1	6
		23		1	1	0	0	0	2
		24		13	2	19	0	6	0
	11	1		4	0	0	0	1	0
		2		0	0	0	0	0	0
		3		0	0	0	0	1	0
		4		0	4	0	0	0	0
		5		0	17	0	1	0	2
		6		1	69	0	54	0	13
		7		2	20	3	11	0	19
		8		9	27	12	11	6	7
		9		12	18	6	13	6	9
		10		4	11				

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C-H STEVENS RECORDER TRAFFIC COUNT
JUNE 1981 - NOVEMBER 1981

YEAR	MONTH	DAY	HOUR	LOCATION				HT02		HT03	
				HT01 IN	OUT TRAFFIC	IN TRAFFIC	OUT TRAFFIC	IN TRAFFIC	OUT TRAFFIC	IN TRAFFIC	OUT TRAFFIC
81	6	11	10			6	10			8	8
			11	15	7	4	8			4	5
		12		13	12	13	6			4	3
		13		12	17	11	3			10	2
		14		11	19	10	26			4	13
		15		21	10	12	3			12	5
		16		50	4	48	2			8	0
		17		39	3	9	4			19	4
		18		24	4	14	1			10	6
		19		11	4	6	0			7	1
		20		4	1	2	1			5	3
		21		2	6	0	0			2	3
		22		1	12	1	10			2	7
		23		2	3	1	0			0	1
		24		12	1	17	0				

C-H STEVENS RECORDER TRAFFIC COUNT
JUNE 1981 - NOVEMBER 1981

YEAR	MONTH	DAY	HOUR	LOCATION		RT01		RT02		RT03	
				IN	OUT	IN	OUT	IN	OUT	IN	OUT
81	6	11	24	5	1			2	0	6	0
		12	1								
			2	3	0			0	0	3	0
			3	0	0			0	0	0	1
			4	1	0			0	0	0	0
			5	1	15			0	0	0	0
			6	1	85			1	72	0	3
			7	4	17			4	7	0	15
			8	14	11			15	8	0	14
			9	10	11			1	5	4	6
			10	9	13			4	8	8	3
			11	5	18			7	12	3	10
			12	16	5			10	4	0	8
			13	19	16			15	4	5	6
			14	16	20			7	21	4	2
										4	6

C-H STEVENS RECORDER TRAFFIC COUNT
JUNE 1981 - NOVEMBER 1981

YEAR	MONTH	DAY	HOUR	LOCATION				BT02 IN	OUT	BT03 IN	OUT
				BT01 IN	TRAFFIC	TRAFFIC	TRAFFIC				
81	6	12	15	18	8	13	4	4	8	4	8
		16		67	10	65	3			20	4
		17		41	1	6	4			18	6
		18		28	4	7	0			12	2
		19		7	3	1	1			8	1
		20		7	5	1	1			4	3
		21		6	4	1	0			5	1
		22		1	8	0	8			2	7
		23		4	0	3	0			2	2
		24		13	0	17	0			5	3
	13	1		3	2	0	0			2	0
		2		1	0	0	0			0	0
		3		1	0	0	0			0	0
		4		0	1	0	0			0	0
		5		1	5	0	0			0	0

C-4 STEVENS RECORDER TRAFFIC COUNT
JUNE 1981 - NOVEMBER 1981

YEAR	MONTH	DAY	HOUR	LOCATION		HT02		HT03	
				HT01 IN	OUT	IN	OUT	IN	OUT
81	6	13	5						
			6	0	19	0	15	0	0
			7	2	1	2	3	0	2
			8	7	6	9	2	1	4
			9	6	5	3	2	4	2
			10	2	4	3	1	1	7
			11	8	3	1	0	3	3
			12	8	5	1	0	4	2
			13	0	12	1	2	5	4
			14	6	20	0	18	5	9
			15	3	5	2	2	5	7
			16	16	3	16	0	6	5
			17	8	4	0	0	6	2
			18	5	8	2	0	4	4
			19	9	3	1	1	4	4

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C-4 STEVENS RECORDER TRAFFIC COUNT
JUNE 1981 - NOVEMBER 1981

YEAR	MONTH	DAY	HOUR	LOCATION		BT02		BT03	
				BT01 IN	OUT	IN	OUT	IN	OUT
TRAFFIC	TRAFFIC	TRAFFIC	TRAFFIC	TRAFFIC	TRAFFIC	TRAFFIC	TRAFFIC	TRAFFIC	TRAFFIC
81	6	13	19	6	6	1	0	4	3
			20						
			21	6	6	0	1	0	0
			22	2	9	1	7	3	2
			23	2	1	1	2	2	3
			24	11	1	14	0	0	0
		14	1	4	0	0	0	4	2
			2	1	1	1	0	2	2
			3	2	0	1	0	0	0
			4	1	1	0	1	1	0
			5	0	3	0	2	0	0
			6	0	18	0	14	0	1
			7	3	3	1	2	0	3
			8	8	1	8	3	3	2
			9	3	4	1	0	1	4

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C-R STEVENS RECORDER TRAFFIC COUNT
JUNE 1981 - NOVEMBER 1981

YEAR	MONTH	DAY	HOUR	LOCATION		BT02		BT03	
				HT01 IN	OUT	IN	OUT	IN	OUT
81	6	14	10	2	8	0	1	4	3
		11		0	7	0	0	5	6
		12		10	10	1	10	4	6
		13		2	14	2	1	3	2
		14		6	19	1	15	3	5
		15		9	3	2	3	4	5
		16		20	3	15	0	4	6
		17		14	6	2	0	5	6
		18		17	6	5	2	9	0
		19		7	5	3	0	5	2
		20		4	3	2	1	4	3
		21		2	4	2	0	2	0
		22		1	13	3	8	7	6
		23		1	0	1	0	3	1
		24		13	5				

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C-H STEVENS RECORDER TRAFFIC COUNT
JUNE 1981 - NOVEMBER 1981

YEAR	MONTH	DAY	HOUR	LOCATION				BT02		BT03	
				BT01 IN	OUT	IN	OUT	IN	OUT	IN	OUT
81	6	14	24			16	0			4	1
		15	1	5	1						
		2		0	0	0	0	3	1		
		3		0	0	0	0	0	0		
		4		0	0	0	0	1	0		
		5		0	14	0	1	0	0		
		6		2	67	0	68	0	14		
		7		4	19	0	7	1	20		
		8		8	17	10	8	5	4		
		9		7	13	4	8	4	8		
		10		9	12	5	4	3	5		
		11		5	11	8	4	3	10		
		12		4	8	1	3	11	4		
		13		12	12	9	12	6	8		
		14		8	24						

C-4 STEVENS RECORDER TRAFFIC COUNT
JUNE 1981 - NOVEMBER 1981

YEAR	MONTH	DAY	HOUR	LOCATION		BT02		BT03	
				HT01 IN	OUT	IN	OUT	IN	OUT
81	6	15	14			3	17	3	8
		15		10	8	9	3	5	16
		15		57	5	51	4	9	6
		17		36	13	15	1	15	2
		18		24	7	13	3	19	1
		19		14	4	11	3	6	1
		20		6	4	2	0	2	2
		21		11	5	3	0	2	4
		22		6	7	0	5	3	6
		23		5	1	1	0	2	1
		24		9	1	11	0	7	0
	16	1		5	2	0	0	2	0
		2		0	0	0	0	1	1
		3		0	0	0	0	0	0
		4		0	1	0	0	0	0

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C-B STEVENS RECORDER TRAFFIC COUNT
JUNE 1981 - NOVEMBER 1981

YEAR	MONTH	DAY	HOUR	LOCATION		BT02		BT03		OUT TRAFFIC	IN TRAFFIC	OUT TRAFFIC	IN TRAFFIC
				BT01 IN	BT01 OUT	IN	OUT	IN	OUT				
81	6	16	4	0	13			0		0		0	
		5				0	3					3	
		6		1	66	0	58					12	
		7		3	21	1	7					19	
		8		8	22	12	12			6		9	
		9		6	27	17	10			6		11	
		10		9	23	4	13			2		7	
		11		12	14	13	11			3		8	
		12		13	19	6	11			11		5	
		13		19	17	12	11			6		4	
		14		9	17	11	14			4		11	
		15		22	10								
		16		44	11								
		17		43	6								
		18		27	7								
		19		29	5								
		20		27	5								
		21		10	2								
		22		8	22								
		23		8	4								
		24		12	2								
		1		13	1								
		2		1	1								

C-H STEVENS RECORDER TRAFFIC COUNT
JUNE 1981 - NOVEMBER 1981

YEAR	MONTH	DAY	HOUR	LOCATION		HT02		HT03	
				HT01	OUT TRAFFIC	IN TRAFFIC	OUT TRAFFIC	IN TRAFFIC	OUT TRAFFIC
11-1-85	6	17	3	2	1				
			4	0					
	7	7	5	0	11				
			4	0	0				
	5	0	34						
	6	0	41						
	7	0	20						
	8	4	14						
	9	27	5						
	10	11	2						
	11	12	15						
	12	4	13						
	13	1	2						
	14	1	0						
	15	1	0						
	16	0	0						
	8	1	17	5	0	8	3	4	23
			18	11	4	7	27	10	9
			19	79	4	2	4	8	10
			20	33	12	0	3	4	3
			21	11	10	1	3	3	1
			22	17	13	3	6	2	3
			23	15	5	11	2	5	2
			24	0	12	1	13	2	3

C-4 STEVENS RECORDER TRAFFIC COUNT JUNE 1981 - NOVEMBER 1981

YEAR	ROUTE	DAY	NUMBER	LOCATION				BT02		BT03	
				BT01		OUT TRAFFIC	IN TRAFFIC	OUT TRAFFIC	IN TRAFFIC		
				IN TRAFFIC	OUT TRAFFIC						
81	1	3	1			1	1	0	1		
			2	0	16	0	0	0	0		
			3	0	35	0	0	0	0		
			4	0	52	0	0	0	1		
			5	0	31	6	1	0	1		
			6	0	52	6	7	1	0		
			7	0	16	70	4	7	2		
			8	58	13	9	15	16	1		
			9	18	7	9	6	21	3		
			10	13	3	6	7	14	5		
			11	31	2	14	8	7	2		
			12	4	17	4	8	13	4		
			13	1	7	15	5	7	2		
			14	1	0	16	21	12	4		
			15	0	0	24	14	12	8		

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C-3 STEVENS RECORDER TRAFFIC COUNT
JUNE 1961 - NOVEMBER 1961

YEAR	MONTH	DAY	LOCATION		HT01		HT02		HT03	
			IN	OUT	IN	OUT	IN	OUT	IN	OUT
61	7	1	2	0	6	45	5	18	11	12
		15	4	4	11	13	4	24		
		17	14	0	3	33	5	23		
		19	79	5	0	4	4	11		
		20	41	15	4	4	5	8		
		21	25	7	1	1	2	5		
		22	71	11	2	4	2	4		
		23	0	9	13	5	6	2		
		24	0	12	1	16	3	4		
	9	1	9	17	0	0	0	2		
		2	0	14	0	0	0	0		
		3	0	15	0	0	0	0		
		4	0	62	1	0	1	1		
		5	0	41	8	4	2	0		

C-4 STEVEN'S RECORDER TRAFFIC COUNT JUNE 1981 - NOVEMBER 1981

YEAR	MONTH	DAY	LOCATION				BT02		BT03	
			BT01 IN	BT01 OUT	BT02 IN	BT02 OUT	BT03 IN	BT03 OUT	BT03 IN	BT03 OUT
81	7	4	0	41	8	0	7	1		
		7	0	21	66	1	16	2		
		8	16	11	9	23	18	9		
		9			12	7	17	4		
		10	13	3	11	10	9	7		
		11			10	9	15	6		
		12	20	16	8	7	5	4		
		13	25	8	8	12	7	9		
		14	9	1	11	5	10	8		
		15	1	0	23	16	3	13		
		16	2	0	5	63	9	16		
		17	1	0	3	15	5	22		
		18	15	1	2	28	2	23		
		19	43	1	4	4	7	11		
		20	31	9	1	3	3	3		

C-H STEVENS RECORDER TRAFFIC COUNT
JUNE 1981 - NOVEMBER 1981

YEAR	MONTH	DAY	LOCATION		BT02		BT03	
			BT01	IN TRAFFIC	OUT TRAFFIC	IN TRAFFIC	OUT TRAFFIC	
81	7	4	23	12	1	1	2	4
		22	24	19	2	3	4	4
		23		12	8	7	2	1
		24		16		16	0	5
10		1		22		2	0	1
		2		11				
		3		13			1	3
		4		34			0	1
		5		44			1	0
		6		34			0	0
		7				1	9	1
		8				0	22	2
		9				15	19	5
		10	12	6		7	13	6
		11	21	3		5	11	9
		11	19	3		11	0	7

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STEVENS RECORDER TRAFFIC COUNT
JUNE 1981 - NOVEMBER 1981

YEAR	MONTH	DAY	LOCATION				RT02 IN	RT02 OUT	RT03 IN	RT03 OUT
			RT01 IN	RT01 OUT	RT02 IN	RT02 OUT				
81	7	1	24	11	11	17	9	8		
		13	36	8	9	23	16	8		
		14	72	2	6	14	6	15		
		15			25	15	11	9		
		16			5	49	4	18		
		17	1	0	1	8	7	20		
		18	14	2	2	33	7	29		
		19	87	3	2	0	6	8		
		20	38	12	1	1	1	5		
		21	24	9	0	2	2	7		
		22	21	10	1	0	4	3		
		23	25	13	7	3	4	1		
		24			1	13	3	3		
11	1	11	11	18			0	2		
		2	8	17			0	2		
		3	24	24			0	3		

C-H STEVENS RECORDER TRAFFIC COUNT JUNE 1981 - NOVEMBER 1981

YEAR	MONTH	DAY	LOCATION				BT02 IN	BT02 OUT	BT03 IN	BT03 OUT
			BT01 IN	BT01 OUT	BT02 IN	BT02 OUT				
81	7	11	4						1	0
		4		2	61					1
		5								
		5				2			10	1
		7				64			18	0
		8	36	7		12			27	5
		9	16	4		8			10	13
		10	6	4		9			5	6
		11	5	1		1			9	6
		12	3	13		8			6	9
		13	0	6		7			4	3
		14	13	0		4			9	11
		15	0	1		23			22	13
		16	0	1		14			2	18
		17	5	0		4			4	40
		18	0	1		1				

C-8 STEVENS RECORDER TRAFFIC COUNT
JUNE 1981 - NOVEMBER 1981

YEAR	MONTH	DAY	LOCATION				BT02		BT03	
			ST01 IN	ST01 OUT	BT02 IN	BT02 OUT	IN	OUT	IN	OUT
81	7	11	0	1	2	0	4	16		
		14	0	1	2	0	1	3		
		20	55	11	1	0	4	6		
		21	14	9	1	0	2	2		
		22	12	9	1	0	1	0		
		23	0	10	10	2	6	3		
		24	0	14	1	19	0	8		
	12	1	11	13						
		2	12	17						
		3	0	14						
		4	2	31						
		5	4	20	1	0				
		6	0	7						
		7	0	5	22	0	3	1		
		8			5	10	10	2		
		9			4	4				

STEVENS RECORDER TRAFFIC COUNT JUNE 1951 - NOVEMBER 1951

YEAR	MONTH	DAY	LOCATION		BT02		BT03	
			IN TRAFFIC	OUT TRAFFIC	IN TRAFFIC	OUT TRAFFIC	IN TRAFFIC	OUT TRAFFIC
51	7	12	21	4	6	3	11	3
		10						
		11	42	3	6	5	7	4
		12	13	12	5	5	5	3
		13	22	2	4	4	8	2
		14	42	1	2	4	7	3
		15	1	1	18	7	11	3
		16			3	22	14	7
		17			2	2	7	13
		18	3	0	2	3	6	8
		19	22	2	4	1	7	5
		20	7	14	0	4	3	13
		21	13	2	1	1	1	5
		22	11	3	0	2	1	1
		23	1	5	11	0	0	1
							5	0

C-4 STEVENS RECORDER TRAFFIC COUNT
JUNE 1961 - NOVEMBER 1961

YEAR	MONTH	DAY	LOCATION		BT01		BT02		BT03	
			IN	OUT	IN	OUT	IN	OUT	IN	OUT
1961	7	12	24	3	6	1	15	2	4	
		13	1	30	8	1	0	0	1	
		2		0	6	0	0	0	0	
		3		0	17	0	0	1	1	
		4			21	0	0	0	0	
		5		0	9	0	0	0	0	
		6		1	16	1	0	0	0	
		7		13	3	14	1	3	1	
		8		67	11	2	13	5	3	
		9		4	4	3	0	4	2	
		10		10	2	0	4	9	5	
		11		7	1	2	1	5	6	
		12		7	8	2	1	8	7	
		13		1	2	1	2	7	2	
		14		1	2					

C-8 STEVENS RECORDER TRAFFIC COUNT
JUNE 1981 - NOVEMBER 1981

YEAR	MONTH	DAY	HOUR	LOCATION		BT02		BT03		OUT TRAFFIC	IN TRAFFIC	OUT TRAFFIC	IN TRAFFIC
				BT01	IN	IN	OUT	IN	OUT				
81	7	13	14			0		2			8	7	
			15	0	0	12	3				7	8	
			16	1	0	2	18				3	6	
			17	2	1	1	1				10	1	
			18	10	0	2	0				5	5	
			19	16	5	0	0				6	7	
			20	2	7	0	1				1	6	
			21	69	12	0	1				1	6	
			22	19	11	0	1				2	5	
			23	9	11	5	1				5	1	
			24	11	20	2	10				0	7	
	14		1	15	10	1	0				0	1	
			2	59	16	0	1				0	1	
			3	20	16	0	0				0	1	
			4	6	49	2	0				0	0	

C-B STEVENS RECORDER TRAFFIC COUNT
JUNE 1981 - NOVEMBER 1981

YEAR	MONTH	DAY	HOUR	LOCATION				BT02		BT03	
				BT01 IN	BT01 OUT	BT02 IN	BT02 OUT	BT03 IN	BT03 OUT	BT03 IN	BT03 OUT
81	7	13	14			0	0	0	2	8	7
			15			0	0	12	3	7	8
			16			1	0	2	18	3	6
			17			2	1	1	1	10	1
			18			10	0	2	0	5	5
			19			16	5	0	0	6	7
			20			2	7	0	1	1	6
			21			69	12	0	1	1	6
			22			19	11	0	1	2	5
			23			9	11	5	1	5	1
			24			11	20	2	10	0	7
	14		1			15	10	1	0	0	1
			2			59	16	0	1	0	1
			3			20	16	0	0	0	0
			4			6	49	2	0	0	0

C-H STEVENS RECORDER TRAFFIC COUNT JUNE 1981 - NOVEMBER 1981

YEAR	MONTH	DAY	HOUR	LOCATION				HT02 IN	HT02 OUT	HT03 IN	HT03 OUT
				HT01 IN	HT01 OUT	HT02 IN	HT02 OUT				
81	7	14	4	8	28	0	1	0	1	0	0
		5								2	0
		6		9	42	2	0	2	0	6	0
		7		9	18	62	4			24	4
		8		12	17	15	13			19	7
		9		7	4	8	7			11	4
		10		4	3	12	8			8	6
		11		15	2	11	9			15	5
		12		0	7	7	9			6	5
		13		1	6	10	12			9	5
		14		0	1	10	8			10	9
		15		0	1	16	11			10	8
		16		0	0	12	44				
		17		0	0	4	10				
		18		18	1	4	30				
		19				2	4				
		20				1	0				
		21				0	4				

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C-H STEVENS RECORDER TRAFFIC COUNT
JUNE 1981 - NOVEMBER 1981

YEAR	MONTH	DAY	HOUR	LOCATION				HT02 IN	HT02 OUT	HT03 IN	HT03 OUT
				BT01 IN	BT01 OUT	BT01 IN	BT01 OUT				
81	7	14	22					2	3		
			23					13	1		
			24					0	0		
	15		1					0	0		
			2					0	0		
			3					0	0		
			4					0	0		
			5					0	0		
			6					0	0		
			7					1	0		
			8					69	3		
			9					10	19		
	7		11					15	13		
			12					15	0		
			13					18	11		
			14					4	78		
			15					3	9		
			16					1	20		
			17					0	2		
			18					1	2		
			19					3	4		
			20					2	4		
			21					16	8		
			22					2	11		
			23					0	4		
			24					0	2		
	8		1					0	0		
			2					0	0		
			6							8	6
			13							16	13
			17							7	17
			25							7	25
			20							8	20
			11							3	11
			4							4	4
			3							2	3
			4							8	4
			1							7	1
			5							2	5
			1							1	1
			2							1	2
			1							2	1

C-H STEVENS RECORDER TRAFFIC COUNT
JUNE 1981 - NOVEMBER 1981

YEAR	MONTH	DAY	HOUR	LOCATION		BT01		BT02		BT03	
				IN	OUT	IN	OUT	IN	OUT	IN	OUT
81	6	3									
		4									
		5									
		6									
		7									
		8									
		9									
		10									
		11									
		12									
		13									
		14									
		15									
		16									
		17									
		18									
		19									
		20									
		21									
		22									
		23									
		24									

C-H STEVEN'S RECORDER TRAFFIC COUNT
JUNE 1981 - NOVEMBER 1981

YEAR	MONTH	DAY	HOUR	LOCATION		BT02		BT03	
				BT01 IN	OUT	IN	OUT	IN	OUT
81	8	8	24			0	0	2	5
		9	1			0	0	1	2
		2				0	0	1	0
		3				0	0	3	1
		4				0	0	0	0
		5				10	7	0	1
		6				3	2	3	0
		7				4	1	6	6
		8				0	1	4	4
		9				0	1	3	1
		10				2	2	3	5
		11				2	1	5	4
		12				2	3	8	2
		13				12	5	4	5
		14				3	12	6	6
		15				2	3	8	5
		16				0	2	4	9
		17				1	2	2	6
		18				1	1	0	5
		19				2	0	4	3
		20				1	0	2	3
		21				3	5	0	3

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C-4 STEVEN'S RECORDER TRAFFIC COUNT
JUNE 1961 - NOVEMBER 1961

YEAR	MONTH	DAY	HOUR	LOCATION				HT02		HT03	
				BT01 IN	OUT TRAFFIC	IN TRAFFIC	OUT TRAFFIC	IN TRAFFIC	OUT TRAFFIC	IN TRAFFIC	OUT TRAFFIC
61	6	9	22			0	9	5	0		
			23			0	0	4	3		
			24			0	0	1	2		
	10		1			0	0	0	1		
			2			0	0	0	1		
			3			0	0	0	1		
			4			3	0	0	1		
			5			82	1	6	0		
			6			9	19	17	3		
			7			7	7	28	9		
			8			8	4	15	8		
			9			8	8	10	6		
			10			7	2	11	5		
			11			9	9	5	5		
			12			9	10	5	7		
			13			15	10	5	11		
			14			8	59	12	11		
			15			2	13	10	24		
			16			3	23	5	19		
			17			6	9	4	23		
			18			3	3	5	7		
			19			2	3				

C-3 STEVENS RECORDER TRAFFIC COUNT
JUNE 1981 - NOVEMBER 1981

YEAR	MONTH	DAY	HOUR	LOCATION		BT02		BT03	
				BT01 IN	OUT	IN	OUT	IN	OUT
81	6	10	19			4	0	6	6
			20					4	7
		21				8	2		
		22				2	10	3	0
		23				0	3	6	0
		24				0	0	4	6
						0	0	1	5
		11				1	0	1	0
		2				0	0	0	2
		3				0	0	1	1
		4				0	0	0	1
		5				71	2	0	0
		6				9	14	4	0
		7				10	5	17	0
		8				9	9	31	7
		9				20	8	11	8
		10				2	6	9	4
		11				11	7	13	5
		12				14	18	5	4
		13				18	15	6	9
		14				9	55	3	9
		15				5	16	7	11
		16				2	29	13	13
								7	20

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C-4 STEVENS RECORDER TRAFFIC COUNT
JUNE 1981 - NOVEMBER 1981

YEAR	MONTH	DAY	LOCATION		BT02		BT03		OUT TRAFFIC	IN TRAFFIC	OUT TRAFFIC	IN TRAFFIC
			BT01 IN	BT01 OUT	IN	OUT	IN	OUT				
81	6	11	17		4		5					
		12			1		2		7		23	
		13			2		2		6		16	
		14			0		3		2		6	
		15			10		2		3		4	
		16			0		10		3		4	
		17			1		0		5		3	
		18			0		0		3		5	
		19			0		0		0		5	
		20			0		0		0		5	
		21			0		0		1		2	
		22			0		0		0		3	
		23			0		0		0		0	
		24			0		0		0		0	
		25			63		5		2		0	
		26			10		18		15		1	
		27			13		5		36		6	
		28			9		9		14		4	
		29			12		15		16		5	
		30			5		7		12		5	
		31			10		8		6		6	
		1			14		11		4		6	
		2			14		17		7		8	
		3			7		43					

C-4 STEVENS RECORDER TRAFFIC COUNT
JUNE 1981 - NOVEMBER 1981

YEAR	MONTH	DAY	HOUR	LOCATION				BT02 IN	BT02 OUT	BT03 IN	BT03 OUT
				BT01 IN	BT01 OUT	BT02 IN	BT02 OUT				
81	8	12	14			3				8	6
			15							9	22
			16			1	29			8	16
			17			2	2			3	29
			18			1	1			1	12
			19			4	1			0	4
			20			0	1			2	3
			21			13	1			1	1
			22			1	11			4	0
			23			0	3			2	2
			24			0	0			1	8
	11		1			0	0			0	0
			2			0	1			0	1
			3			0	1			0	1
			4			1	0			1	0
			5			74	5			2	0
			6			11	13			22	1
			7			9	9			25	4
			8			10	0			13	10
			9			15	6			15	9
			10			9	14			9	11
			11			6	15			8	12

C-H SIPVENS RECORDER TRAFFIC COUNT
JUNE 1981 - NOVEMBER 1981

YEAR	MONTH	DAY	HOUR	LOCATION		BT01		BT02		BT03		OUT TRAFFIC	OUT TRAFFIC
				IN	OUT	IN	OUT	IN	OUT	IN	OUT		
81	8	13	12	12	8	12	25	7	4	7	4		
			13	12	25	12	47	9	8	9	8		
			14	8	47	8	11	14	16	14	16		
			15	3	11	3	34	16	15	16	15		
			16	0	34	0	0	8	18	8	18		
			17	1	0	1	1	4	22	4	22		
			18	5	1	5	2	2	17	2	17		
			19	1	2	1	0	3	4	3	4		
			20	0	0	0	3	11	1	11	1		
			21	13	3	13	8	1	2	1	2		
			22	1	8	1	0	5	4	5	4		
			23	1	0	1	1	4	1	4	1		
			24	0	1	0	2	2	6	2	6		
	14		1	0	0	0	0	2	1	2	1		
			2	0	0	0	0	2	0	2	0		
			3	0	0	0	0	1	0	1	0		
			4	3	1	3	2	0	0	0	0		
			5	85	2	85	19	3	1	3	1		
			6	12	19	12	10	17	0	17	0		
			7	21	10	21	17	22	4	22	4		
			8	6	17	6	11	11	9	11	9		
			9	12	10	12							

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C-H STEVENS RECORDER TRAFFIC COUNT
JUNE 1981 - NOVEMBER 1981

YEAR	MONTH	DAY	HOUR	LOCATION				HT02		HT03	
				BT01		OUT TRAFFIC	IN TRAFFIC	OUT TRAFFIC	IN TRAFFIC		
				IN	TRAFFIC						
81	8	14	9				5	6	11	3	
			10				6	18	5	8	
			11				11	12	5	5	
			12				21	13	7	8	
			13				8	65	6	14	
			14				5	18	11	9	
			15				2	27	11	10	
			16				2	2	7	19	
			17				0	2	4	20	
			18				1	0	3	6	
			19				2	3	2	4	
			20				9	3	2	4	
			21				0	12	3	2	
			22				0	0	3	1	
			23				0	0	7	4	
			24				2	2	0	8	
		15	1				0	0	0	0	
			2				0	0	1	0	
			3				0	2	0	0	
			4				0	0	0	0	
			5				21	4	0	1	
			6				0	9	9	1	

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C-H STEVENS RECORDER TRAFFIC COUNT
JUNE 1981 - NOVEMBER 1981

YEAR		MONTH	DAY	HOUR	LOCATION		BT01		BT02		BT03	
					IN	OUT	IN	OUT	IN	OUT	IN	OUT
					TRAFFIC	TRAFFIC	TRAFFIC	TRAFFIC	TRAFFIC	TRAFFIC	TRAFFIC	TRAFFIC
81	8	15		7			5	3			8	2
				8			7	5			6	3
				9			5	4			5	3
				10			3	7			5	5
				11			5	9			7	4
				12			0	2			2	9
				13			13	6			6	12
				14			2	22			8	6
				15			0	2			8	10
				16			0	1			1	9
				17			2	0			4	9
				18			0	2			1	6
				19			1	0			3	4
				20			2	2			2	3
				21			9	2			3	2
				22			0	12			4	2
				23			1	1			1	2
				24			0	0			3	4
		16		1			2	1			1	1
				2			0	0			1	3
				3			0	0			0	1
				4			2	2				

C-4 STEVENS RECORDER TRAFFIC COUNT
JUNE 1981 - NOVEMBER 1981

YEAR	MONTH	DAY	HOUR	LOCATION				BT02		BT03	
				BT01		OUT		IN		OUT	
				IN	TRAFFIC	TRAFFIC	OUT	IN	TRAFFIC	TRAFFIC	OUT
81	8	16	4					9	4	1	0
			5					2	16	0	0
			6					1	1	3	0
			7					3	1	6	6
			8					0	1	3	2
			9					2	5	7	7
			10					2	0	2	5
			11					2	4	2	3
			12					11	0	4	4
			13					2	13	5	10
			14					0	3	11	7
			15					2	1	4	8
			16					2	2	8	3
			17					2	0	3	4
			18					2	0	4	7
			19					2	4	1	4
			20					10	3	1	4
			21					5	6	1	3
			22					1	2	2	0
			23					0	0	1	4
			24					0	2	0	3
			1					0	2	1	0

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C-M STEVEN'S RECORDER TRAFFIC COUNT

JUNE 1981 - NOVEMBER 1981

YEAR	MONTH	DAY	LOCATION		HOUR	BT01		BT02		BT03	
			IN	OUT		IN	OUT	IN	OUT	IN	OUT
YEAR	MONTH	DAY	IN	OUT	HOUR	IN	OUT	IN	OUT	IN	OUT
81	6	17	1	0	2	1	0	0	0	0	0
		3	1	1		1	1	0	1	0	1
		4	1	0		1	0	1	0	1	0
		5	75	4		75	4	4	0	4	0
		6	6	12		6	12	16	0	16	0
		7	9	12		9	12	28	9	28	9
		8	7	14		7	14	9	6	9	6
		9	13	6		13	6	7	3	7	3
		10	8	14		8	14	12	4	12	4
		11	10	13		10	13	9	6	9	6
		12	9	13		9	13	6	7	6	7
		13	24	9		24	9	17	9	17	9
9		17	11	14		11	14	4	5	4	5
		17	48	5		48	5	1	1	1	1
		18	3	4		3	4	10	2	10	2
		19	3	1		3	1	1	0	1	0
		20	2	1		2	1	0	1	0	1
		21	4	10		4	10	6	7	6	7
		22	13	2		13	2	12	13	12	13
		23	1	1		1	1	1	0	1	0
		24	0	0		0	0	1	0	1	0
	14	14	1	1		1	1	1	0	1	0
		17	12	13		12	13	12	13	12	13
		18	12	13		12	13	12	13	12	13
		19	12	13		12	13	12	13	12	13
		20	12	13		12	13	12	13	12	13
		21	12	13		12	13	12	13	12	13
		22	12	13		12	13	12	13	12	13
		23	12	13		12	13	12	13	12	13
		24	12	13		12	13	12	13	12	13
		25	12	13		12	13	12	13	12	13
		26	12	13		12	13	12	13	12	13
		27	12	13		12	13	12	13	12	13
		28	12	13		12	13	12	13	12	13
		29	12	13		12	13	12	13	12	13
		30	12	13		12	13	12	13	12	13
		31	12	13		12	13	12	13	12	13

C-3 STEVENS RECORDER TRAFFIC COUNT
JUNE 1981 - NOVEMBER 1981

YEAR	MONTH	DAY	HOUR	LOCATION		BT02		BT03	
				BT01 IN	OUT	IN	OUT	IN	OUT
81	9	18	10	7	16	10	11	16	11
			11	15	11	15	10	11	10
			12	11	20	11	19	18	19
			13	20	65	20	18	13	18
			14	18	39	18	10	10	13
			15	13	17	13	4	4	3
			16	6	1	6	1	1	4
			17	1	13	1	13	13	1
			18	1	0	1	0	0	0
			19	1	0	1	0	1	0
			20	0	0	0	0	1	0
			21	0	0	0	5	5	5
			22	8	4	8	26	26	4
			23	4	3	4	11	11	10
			24	4	6	4	10	10	10
			1	6	2	6	19	19	15
			2	5	8	5	11	11	11
			3	8	8	8	13	13	10
			4	2	2	2	3	3	1
			5	4	1	4	1	1	0
			6	8	1	8	1	1	0
			7	1	4	1	3	3	1
			8	0	0	0	0	0	0
			9	1	0	1	0	1	5
			10	0	3	0	1	1	1
			11	0	7	0	1	1	1
			12	0	1	0	1	1	1
			13	0	1	0	1	1	1
			14	0	1	0	1	1	1
			15	0	1	0	1	1	1
			16	0	1	0	1	1	1
			17	0	1	0	1	1	1
			18	0	1	0	1	1	1
			19	0	1	0	1	1	1
			20	0	1	0	1	1	1
			21	0	1	0	1	1	1
			22	0	1	0	1	1	1
			23	0	1	0	1	1	1
			24	0	1	0	1	1	1
			1	0	1	0	1	1	1
			2	0	1	0	1	1	1
			3	0	1	0	1	1	1
			4	0	1	0	1	1	1
			5	0	1	0	1	1	1
			6	0	1	0	1	1	1
			7	0	1	0	1	1	1
			8	0	1	0	1	1	1
			9	0	1	0	1	1	1
			10	0	1	0	1	1	1
			11	0	1	0	1	1	1
			12	0	1	0	1	1	1
			13	0	1	0	1	1	1
			14	0	1	0	1	1	1
			15	0	1	0	1	1	1
			16	0	1	0	1	1	1
			17	0	1	0	1	1	1
			18	0	1	0	1	1	1
			19	0	1	0	1	1	1
			20	0	1	0	1	1	1
			21	0	1	0	1	1	1
			22	0	1	0	1	1	1
			23	0	1	0	1	1	1
			24	0	1	0	1	1	1
			1	0	1	0	1	1	1
			2	0	1	0	1	1	1
			3	0	1	0	1	1	1
			4	0	1	0	1	1	1
			5	0	1	0	1	1	1
			6	0	1	0	1	1	1
			7	0	1	0	1	1	1
			8	0	1	0	1	1	1
			9	0	1	0	1	1	1
			10	0	1	0	1	1	1
			11	0	1	0	1	1	1
			12	0	1	0	1	1	1
			13	0	1	0	1	1	1
			14	0	1	0	1	1	1
			15	0	1	0	1	1	1
			16	0	1	0	1	1	1
			17	0	1	0	1	1	1
			18	0	1	0	1	1	1
			19	0	1	0	1	1	1
			20	0	1	0	1	1	1
			21	0	1	0	1	1	1
			22	0	1	0	1	1	1
			23	0	1	0	1	1	1
			24	0	1	0	1	1	1
			1	0	1	0	1	1	1
			2	0	1	0	1	1	1
			3	0	1	0	1	1	1
			4	0	1	0	1	1	1
			5	0	1	0	1	1	1
			6	0	1	0	1	1	1
			7	0	1	0	1	1	1
			8	0	1	0	1	1	1
			9	0	1	0	1	1	1
			10	0	1	0	1	1	1
			11	0	1	0	1	1	1
			12	0	1	0	1	1	1
			13	0	1	0	1	1	1
			14	0	1	0	1	1	1
			15	0	1	0	1	1	1
			16	0	1	0	1	1	1
			17	0	1	0	1	1	1
			18	0	1	0	1	1	1
			19	0	1	0	1	1	1
			20	0	1	0	1	1	1
			21	0	1	0	1	1	1
			22	0	1	0	1	1	1
			23	0	1	0	1	1	1
			24	0	1	0	1	1	1
			1	0	1	0	1	1	1
			2	0	1	0	1	1	1
			3	0	1	0	1	1	1
			4	0	1	0	1	1	1
			5	0	1	0	1	1	1
			6	0	1	0	1	1	1
			7	0	1	0	1	1	1
			8	0	1	0	1	1	1
			9	0	1	0	1	1	1
			10	0	1	0	1	1	1
			11	0	1	0	1	1	1
			12	0	1	0	1	1	1
			13	0	1	0	1	1	1
			14	0	1	0	1	1	1
			15	0	1	0	1	1	1
			16	0	1	0	1	1	1
			17	0	1	0	1	1	1
			18	0	1	0	1	1	1
			19	0	1	0	1	1	1
			20	0	1	0	1	1	1
			21	0	1	0	1	1	1
			22	0	1	0	1	1	1
			23	0	1	0	1	1	1
			24	0	1	0	1	1	1
			1	0	1	0	1	1	1
			2	0	1	0	1	1	1
			3	0	1	0	1	1	1
			4	0	1	0	1	1	1
			5	0	1	0	1	1	1
			6	0	1	0	1	1	1
			7	0	1	0	1	1	1
			8	0	1	0	1	1	1
			9	0	1	0	1	1	1
			10	0	1	0	1	1	1
			11	0	1	0	1	1	1
			12	0	1	0	1	1	1
			13	0	1	0	1	1	1
			14	0	1	0	1	1	1
			15	0	1	0	1	1	1
			16	0	1	0	1	1	1
			17	0	1	0	1	1	1
			18	0	1	0	1	1	1
			19	0	1	0	1	1	1
			20	0	1	0	1	1	1
			21	0	1	0	1	1	1
			22	0	1	0	1	1	1
			23	0	1	0	1	1	1
			24	0	1	0	1	1	1
			1	0	1	0	1	1	1
			2	0	1	0	1	1	1
			3	0	1	0	1	1	1
			4	0	1	0	1	1	1
			5	0	1	0	1	1	1
			6	0	1	0	1	1	1
			7	0	1	0	1	1	1
			8	0	1	0	1	1	1
			9	0	1	0	1	1	1
			10	0	1	0	1	1	1
			11	0	1	0	1	1	1
			12	0	1	0	1	1	1
			13	0	1	0	1	1	1
			14	0	1	0	1	1	1
			15	0	1	0	1	1	1
			16	0	1	0	1	1	1
			17	0	1	0	1	1	1
			18	0	1	0	1	1	1
			19	0	1	0	1	1	1
			20	0	1	0	1	1	1
			21	0	1	0	1	1	1
			22	0	1	0	1	1	1
			23	0	1	0	1	1	1
			24	0	1	0	1	1	1
			1	0	1	0	1	1	1
			2	0	1	0	1	1	1
			3	0	1	0	1	1	1
			4	0	1	0	1	1	1
			5	0	1	0	1	1	1
			6	0	1	0	1	1	1
			7	0	1	0	1	1	1
			8	0	1	0	1	1	1
			9	0	1	0	1	1	1
			10	0	1	0	1	1	1
			11	0	1	0	1	1	1
			12	0	1	0	1	1	1
			13	0	1	0	1	1	1
			14	0	1	0	1	1	1
			15	0	1	0	1	1	1
			16	0	1	0	1	1	1
			17	0	1	0	1	1	1
			18	0	1	0	1	1	1
			19	0	1	0	1	1	1
			20	0	1	0	1	1	1
			21	0	1	0	1	1	1
			22	0	1	0	1	1	1
			23	0	1	0	1	1	1
			24	0	1	0	1	1	1
			1	0	1	0	1	1	1

C-H STEVENS RECORDER TRAFFIC COUNT
JUNE 1981 - NOVEMBER 1981

YEAR	MONTH	DAY	HOUR	LOCATION		BT02		BT03	
				HT01 IN	OUT	IN	OUT	IN	OUT
YEAR	MONTH	DAY	HOUR	TRAFFIC	TRAFFIC	TRAFFIC	TRAFFIC	TRAFFIC	TRAFFIC
81	9	20	14	12	11	12	11	11	11
			15	10	1	10	1	12	3
			16	1	1	1	0	3	0
			17	1	1	1	0	3	0
			18	6	2	2	0	0	0
			19	2	2	2	0	2	0
			20	11	1	11	0	0	0
			21	17	1	17	1	0	0
			22	1	1	1	0	0	0
			23	0	4	0	4	0	0
		21	1	0	1	0	0	0	0
			2	4	1	4	0	0	0
			3	0	0	0	0	0	0
			4	1	0	1	0	0	0
			5	0	6	0	6	7	3
			6	14	1	14	1	7	16
			7	17	5	17	5	13	16
			8	10	10	10	10	12	12
			9	11	12	11	12	11	11
			10	11	12	11	12	10	13
			11	11	17	11	17	17	17
			12	11	17	11	17	10	2
			13	11	3	11	3	4	1
			14	10	3	10	3	1	2
			15	10	2	10	2	0	0
			16	10	1	10	1	0	0
			17	10	0	10	0	0	0
			18	10	0	10	0	0	0
			19	10	0	10	0	0	0
			20	10	0	10	0	0	0
			21	10	0	10	0	0	0
			22	10	0	10	0	0	0
			23	10	0	10	0	0	0
			24	10	0	10	0	0	0
		22	1	10	0	10	0	0	0
			2	10	0	10	0	0	0
			3	10	0	10	0	0	0
			4	10	0	10	0	0	0
			5	10	0	10	0	0	0
			6	10	0	10	0	0	0
			7	10	0	10	0	0	0
			8	10	0	10	0	0	0
			9	10	0	10	0	0	0
			10	10	0	10	0	0	0
			11	10	0	10	0	0	0
			12	10	0	10	0	0	0
			13	10	0	10	0	0	0
			14	10	0	10	0	0	0
			15	10	0	10	0	0	0
			16	10	0	10	0	0	0
			17	10	0	10	0	0	0
			18	10	0	10	0	0	0
			19	10	0	10	0	0	0
			20	10	0	10	0	0	0
			21	10	0	10	0	0	0
			22	10	0	10	0	0	0
			23	10	0	10	0	0	0
			24	10	0	10	0	0	0
		22	1	10	0	10	0	0	0
			2	10	0	10	0	0	0
			3	10	0	10	0	0	0
			4	10	0	10	0	0	0
			5	10	0	10	0	0	0
			6	10	0	10	0	0	0
			7	10	0	10	0	0	0
			8	10	0	10	0	0	0
			9	10	0	10	0	0	0
			10	10	0	10	0	0	0
			11	10	0	10	0	0	0
			12	10	0	10	0	0	0
			13	10	0	10	0	0	0
			14	10	0	10	0	0	0
			15	10	0	10	0	0	0
			16	10	0	10	0	0	0
			17	10	0	10	0	0	0
			18	10	0	10	0	0	0
			19	10	0	10	0	0	0
			20	10	0	10	0	0	0
			21	10	0	10	0	0	0
			22	10	0	10	0	0	0
			23	10	0	10	0	0	0
			24	10	0	10	0	0	0
		22	1	10	0	10	0	0	0
			2	10	0	10	0	0	0
			3	10	0	10	0	0	0
			4	10	0	10	0	0	0
			5	10	0	10	0	0	0
			6	10	0	10	0	0	0
			7	10	0	10	0	0	0
			8	10	0	10	0	0	0
			9	10	0	10	0	0	0
			10	10	0	10	0	0	0
			11	10	0	10	0	0	0
			12	10	0	10	0	0	0
			13	10	0	10	0	0	0
			14	10	0	10	0	0	0
			15	10	0	10	0	0	0
			16	10	0	10	0	0	0
			17	10	0	10	0	0	0
			18	10	0	10	0	0	0
			19	10	0	10	0	0	0
			20	10	0	10	0	0	0
			21	10	0	10	0	0	0
			22	10	0	10	0	0	0
			23	10	0	10	0	0	0
			24	10	0	10	0	0	0
		22	1	10	0	10	0	0	0
			2	10	0	10	0	0	0
			3	10	0	10	0	0	0
			4	10	0	10	0	0	0
			5	10	0	10	0	0	0
			6	10	0	10	0	0	0
			7	10	0	10	0	0	0
			8	10	0	10	0	0	0
			9	10	0	10	0	0	0
			10	10	0	10	0	0	0
			11	10	0	10	0	0	0
			12	10	0	10	0	0	0
			13	10	0	10	0	0	0
			14	10	0	10	0	0	0
			15	10	0	10	0	0	0
			16	10	0	10	0	0	0
			17	10	0	10	0	0	0
			18	10	0	10	0	0	0
			19	10	0	10	0	0	0
			20	10	0	10	0	0	0
			21	10	0	10	0	0	0
			22	10	0	10	0	0	0
			23	10	0	10	0	0	0
			24	10	0	10	0	0	0
		22	1	10	0	10	0	0	0
			2	10	0	10	0	0	0
			3	10	0	10	0	0	0
			4	10	0	10	0	0	0
			5	10	0	10	0	0	0
			6	10	0	10	0	0	0
			7	10	0	10	0	0	0
			8	10	0	10	0	0	0
			9	10	0	10	0	0	0
			10	10	0	10	0	0	0
			11	10	0	10	0	0	0
			12	10	0	10	0	0	0
			13	10	0	10	0	0	0
			14	10	0	10	0	0	0
			15	10	0	10	0	0	0
			16	10	0	10	0	0	0
			17	10	0	10	0	0	0
			18	10	0	10	0	0	0
			19	10	0	10	0	0	0
			20	10	0	10	0	0	0
			21	10	0	10	0	0	0
			22	10	0	10	0	0	0
			23	10	0	10	0	0	0
			24	10	0	10	0	0	0
		22	1	10	0	10	0	0	0
			2	10	0	10	0	0	0
			3	10	0	10	0	0	0
			4	10	0	10	0	0	0
			5	10	0	10	0	0	0
			6	10	0	10	0	0	0
			7	10	0	10	0	0	0
			8	10	0	10	0	0	0
			9	10	0	10	0	0	0
			10	10	0	10	0	0	0
			11	10	0	10	0	0	0
			12	10	0	10	0	0	0
			13	10	0	10	0	0	0
			14	10	0	10	0	0	0
			15	10	0	10	0	0	0
			16	10	0	10	0	0	0
			17	10	0	10	0	0	0
			18	10	0	10	0	0	0
			19	10	0	10	0	0	0
			20	10	0	10	0	0	0
			21	10	0	10	0	0	0
			22	10	0	10	0	0	0
			23	10	0	10	0	0	0
			24	10	0	10	0	0	0
		22	1	10	0	10	0	0	0
			2	10	0	10	0	0	0
			3	10	0	10	0	0	0
			4	10	0	10	0	0	0
			5	10	0	10	0	0	0
			6	10	0	10	0	0	0
			7	10	0	10	0	0	0
			8	10	0	10	0	0	0
			9	10	0	10	0	0	0
			10	10	0	10	0	0	0
			11	10	0	10	0	0	0
			12	10	0	10	0	0	0
			13						

C-3 STEVENS RECORDER TRAFFIC COUNT
JUNE 1961 - NOVEMBER 1961

YEAR	MONTH	DAY	HOUR	LOCATION				BT02		BT03	
				BT01 IN	OUT	IN	OUT	IN	OUT	IN	OUT
61	9	22	10			9	9				
			11			7	12				
			12			11	7				
			13			12	15				
			14			15	20				
			15			56	8				
			16			17	12				
			17			54	8				
			18			3	4				
			19			3	1				
			20			2	2				
			21			0	3				
		23	22			3	13				
			23			1	0				
			24			1	1				
			1			0	0				
			2			0	0				
			3			0	0				
			4			0	0				
			5			8	4				
			6			8	7				
			7			20	14				
			8			12	17				
		24	9			14	16				
			10			10	10				
			11			15	10				
			12			14	13				
			13			13	19				
			14			14	14				
			15			54	11				
			16			16	3				
			17			39	4				
			18			5	4				
			19			4	4				
			20			0	0				
			21			3	10				
			22			12	1				
			23			1	1				
			24			0	0				
			1			0	1				
			2			0	1				
			3			0	0				
			4			0	1				

C-4 STEVENS RECORDER TRAFFIC COUNT
JUNE 1981 - NOVEMBER 1981

YEAR	MONTH	DAY	LOCATION		HOUR	BT01		BT02		BT03	
			IN	OUT		IN	OUT	IN	OUT	IN	OUT
81	6	24	4	6	24	4	75	4	4	4	4
		25	15	15	25	15	10	15	1	1	4
		26	3	3	26	3	16	3	1	1	5
		27	10	10	27	10	11	10	3	3	5
		28	11	11	28	11	11	11	4	4	1
		29	12	12	29	12	12	12	2	2	5
		30	13	13	30	13	17	13	1	1	0
		31	14	14	31	14	18	14	1	1	1
		1	15	15	1	15	18	15	0	0	0
		2	16	16	2	16	22	16	1	1	1
		3	17	17	3	17	22	17	1	1	0
		4	18	18	4	18	27	18	1	1	0
		5	19	19	5	19	28	19	5	5	0
		6	20	20	6	20	38	20	2	2	2
		7	21	21	7	21	4	21	2	2	3
		8	22	22	8	22	6	22	1	1	4
		9	23	23	9	23	2	23	1	1	5
		10	24	24	10	24	12	24	2	2	5
		11	25	25	11	25	2	25	0	1	0
		12	26	26	12	26	0	26	1	1	1
		13	27	27	13	27	2	27	0	0	1
		14	28	28	14	28	4	28	1	1	1
		15	29	29	15	29	4	29	1	1	0
		16	30	30	16	30	6	30	1	1	0
		17	31	31	17	31	8	31	5	5	0
		18			18		91		21	21	2
		19			19		10		21	21	8
		20			20		8		6	6	3

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C-3 STEVENS RECORDER TRAFFIC COUNT
JUNE 1981 - NOVEMBER 1981

YEAR	MONTH	DAY	HOUR	LOCATION				BT02 IN	BT02 OUT	BT03 IN	BT03 OUT
				BT01 IN	BT01 OUT	BT01 IN	BT01 OUT				
81	9	25	9			9	9			15	6
			10			15	8			7	6
			11			13	5			8	11
			12			21	8			7	16
			13			11	9			4	8
			14			12	13			10	11
			15			48	12			4	17
			16			12	4			5	21
			17			22	1			7	18
			18			3	2			3	15
			19			7	2			1	1
			20			2	0			3	2
			21			0	0			2	1
			22			0	8			5	2
			23			9	5			3	2
			24			1	0			0	1
			1			0	1			0	0
		25	2			0	1			1	0
			3			0	0			1	0
			4			0	0			0	2
			5			1	0			0	0
			6			3	13				

C-H STEVENS RECORDER TRAFFIC COUNT
JUNE 1981 - NOVEMBER 1981

YEAR	MONTH	DAY	HOUR	LOCATION		BT02		BT03	
				IN	OUT	IN	OUT	IN	OUT
-----				TRAFFIC	TRAFFIC	TRAFFIC	TRAFFIC	TRAFFIC	TRAFFIC
-----				-----	-----	-----	-----	-----	-----
81	7	26	7			6	2	6	0
			8			1	1	6	3
			9			4	4	6	7
		10				6	1	9	8
		11				3	5	6	1
		12				3	2	0	3
		13				2	6	7	4
		14				7	15	8	1
		15				14	4	13	5
		16				9	4	3	12
		17				3	0	3	13
		18				1	1	5	7
		19				3	1	1	2
		20				1	2	3	7
		21				4	1	3	2
		22				2	6	3	2
		23				8	3	4	1
		24				1	1	2	4
		27	1			1	0	0	1
			2			0	0	2	0
			3			1	1	1	1
								1	2

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C-4 STEVEN'S RECORDER TRAFFIC COUNT
JUNE 1981 - NOVEMBER 1981

YEAR	MONTH	DAY	HOUR	LOCATION				BT02		BT03	
				BT01	IN	OUT	TRAFFIC	IN	OUT	IN	OUT
81	9	27	4		0	0	0	0	0	0	0
			5		0	0	0	0	0	0	0
			6		0	9	9	4	0	4	0
			7		6	1	1	8	1	8	1
			8		2	3	3	4	5	4	5
			9		1	2	2	5	2	5	2
			10		0	3	3	10	5	10	5
			11		0	5	5	5	2	5	2
			12		4	1	1	5	12	5	12
			13		2	1	1	3	3	3	3
			14		4	9	9	12	15	12	15
			15		6	1	1	6	7	6	7
			16		0	0	0	3	3	3	3
			17		0	1	1	1	5	1	5
			18		3	0	0	6	9	6	9
			19		4	2	2	1	4	1	4
			20		1	1	1	0	2	0	2
			21		1	1	1	0	2	0	2
			22		0	4	4	6	1	6	1
			23		8	1	1	3	3	3	3
			24		1	0	0	2	3	2	3
		25	1		0	0	0	0	0	0	0

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C-3 STEVENS RECORDER TRAFFIC COUNT
JUNE 1981 - NOVEMBER 1981

YEAR	MONTH	DAY	HOUR	LOCATION		BT02		BT03	
				BT01 IN	OUT	IN	OUT	IN	OUT
81	9	28	1	0	0	0	0	0	0
			2			0	0	0	0
			3			0	0	0	0
			4			0	0	0	0
			5			1	4	4	0
			6			4	89	18	2
			7			7	12	26	6
			8			11	12	7	11
			9			7	5	7	2
			10			4	8	10	8
			11			6	7	7	9
			12			17	11	7	12
			13			11	4	6	11
			14			6	15	10	11
			15			35	1	6	17
			16			8	5	3	17
			17			59	1	4	27
			18			2	11	8	13
			19			1	2	3	11
			20			0	1	1	2
			21			6	1	7	1
			22			3	5	3	2

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C-8 STEVENS RECORDER TRAFFIC COUNT
JUNE 1981 - NOVEMBER 1981

YEAR	MONTH	DAY	HOUR	LOCATION		BT02		BT03	
				BT01 IN	OUT	IN	OUT	IN	OUT
81	9	24	24	5	1	5	1	3	4
			24	1	1	1	1	0	3
		24	1	1	0	1	0	0	0
			2	1	0	1	0	0	0
			3	0	0	0	0	0	0
			4	2	2	2	2	0	0
			5	7	2	7	2	0	0
			6	4	80	4	80	4	1
			7	8	10	8	10	19	0
			8	10	8	10	8	23	7
			9	12	9	12	9	5	7
			10	7	11	7	11	10	4
			11	9	12	9	12	9	7
			12	15	13	15	13	11	4
			13	10	12	10	12	4	15
			14	21	18	21	18	7	10
			15	40	5	40	5	10	11
			16	15	9	15	9	8	11
			17	44	4	44	4	6	17
			18	3	1	3	1	2	27
			19	0	3	0	3	8	9
			20	2	1	2	1	1	7

C-6 STEVENS RECORDER TRAFFIC COUNT
JUNE 1941 - NOVEMBER 1941

YEAR	MONTH	DAY	LOCATION		BT02		BT03	
			BT01 IN	OUT	IN	OUT	IN	OUT
41	7	24					1	1
		25			2	1	1	0
		26			0	7	1	1
		27			9	2	4	6
		28			1	0	0	1
		29			2	0	0	0
		30			0	0	0	2
		31			7	0	0	2
					0	0	0	0
					0	1	3	0
					5	72	23	1
					9	11	26	8
					7	15	13	5
					10	14	9	5
					9	14	10	13
					13	8	11	8
					17	8	7	9
					8	8	10	5
					22	17	10	8
					45	6	11	22
					12	13	8	20
					35	8	11	17

C-4 STEVENS RECORDER TRAFFIC COUNT
JUNE 1981 - NOVEMBER 1981

YEAR	MONTH	DAY	HOUR	LOCATION		HT01		HT02		HT03	
				IN	OUT	IN	OUT	IN	OUT	IN	OUT
81	4	30	18			5	0			2	30
			19			2	1			4	6
			20			3	2			1	2
			21			2	0			6	2
			22			1	8			6	1
			23			6	0			2	4
			24			0	0			0	3
	10	1	1			1	1			0	0
			2			4	0			0	2
			3			3	0			1	2
			4			0	0			0	0
			5			0	1			4	0
			6			9	78			14	2
			7			11	8			13	4
			8			8	15			26	7
			9			12	17			13	2
			10			9	7			8	11
			11			8	9			11	12
			12			12	11			7	4
			13			11	6			10	3
			14			10	10			7	10
			15			42	6				

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C-4 STEVENS RECORDER TRAFFIC COUNT
JUNE 1981 - NOVEMBER 1981

YEAR	MONTH	DAY	HOUR	LOCATION		BT02		BT03	
				HT01 IN	OUT	IN	OUT	IN	OUT
				TRAFFIC	TRAFFIC	TRAFFIC	TRAFFIC	TRAFFIC	TRAFFIC
81	10	1	15			13	15	7	10
			16					11	22
			17			43	2	6	26
			18			3	0	3	12
			19			1	1	2	12
			20			1	1	1	3
			21			3	0	1	3
			22			3	5	5	1
			23			3	3	1	2
			24			0	1	1	2
		2	1			0	1	0	0
			2			0	1	0	1
			3			4	0	0	1
			4			1	0	0	0
			5			0	0	0	0
			6			0	2	3	0
			7			3	91	19	0
			8			11	15	17	7
			9			6	8	6	7
			10			5	10	7	4
			11			8	10	12	2
			12			7	9	12	6
						17	4	10	12

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C-M STEVENS RECORDER TRAFFIC COUNT
JUNE 1981 - NOVEMBER 1981

YEAR	MONTH	DAY	HOUR	LOCATION		BT02		BT03	
				BT01 IN	OUT TRAFFIC	IN TRAFFIC	OUT TRAFFIC	IN TRAFFIC	OUT TRAFFIC
81	10	2	13			8	15	6	5
			14			0	0		
			15			18	19	8	9
			16			25	3		
			17			0	0	12	15
			18			12	11	5	23
			19			0	5	5	23
			20			47	2	2	9
			21			3	0		
			22			0	0	1	1
			23			0	0	1	2
			24			0	7	6	
		1				0	0	3	5
		2				0	0	2	1
		3				0	0	1	2
		4				0	1	1	0
		5				0	1	0	1
		6				0	0	0	0
		7				0	1	1	2
		8				0	22	7	0
		9				11	30	4	2
		10				0	0	13	3
						2	0	5	3

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C-4 STEVENS RECORDER TRAFFIC COUNT
JUNE 1981 - NOVEMBER 1981

YEAR	MONTH	DAY	HOUR	LOCATION		HT02		HT03	
				IN	OUT	IN	OUT	IN	OUT
				TRAFFIC	TRAFFIC	TRAFFIC	TRAFFIC	TRAFFIC	TRAFFIC
81	10	3	10			1	1	7	1
			11			1	3	2	6
			12			4	2	0	11
			13			5	8	3	3
			14			30	3	7	9
			15			3	6	6	6
			16			5	2	7	9
			17			3	0	2	6
			18			2	2	2	1
			19			1	0	2	2
			20			2	1	3	6
			21			0	5	3	2
			22			6	1	5	4
			23			1	0	1	2
			24			0	0	0	1
	4		1			2	0	0	2
			2			3	1	1	1
			3			0	0	0	3
			4			1	0	0	0
			5			3	12	1	0
			6			7	2	4	0
			7					5	4

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C-H STEVENS RECORDER TRAFFIC COUNT
JUNE 1981 - NOVEMBER 1981

YEAR	MONTH	DAY	HOUR	LOCATION		BT02		BT03		OUT	OUT
				BT01	IN	IN	OUT	IN	OUT	TRAFFIC	TRAFFIC
81	10	4	3			2	3	2		4	
			9			2	8	3		4	
		10				3	2	3		3	
		11				5	3	3		4	
		12				6	1	7		6	
		13				2	2	3		3	
		14				3	8	6		1	
		15				7	3	7		5	
		16				2	1	8		5	
		17				6	1	2		4	
		18				2	2	3		11	
		19				1	0	1		7	
		20				0	0	1		2	
		21				0	0	0		1	
		22				2	0	4		0	
		23				6	0	1		3	
		24				0	0	0		1	
		1				0	0	0		1	
		2				0	0	0		2	
		3				0	0	0		1	
		4				0	0	0		0	
		5				0	2	0		0	

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C-B STEVENS RECORDER TRAFFIC COUNT
JUNE 1981 - NOVEMBER 1981

YEAR	MONTH	DAY	HOUR	LOCATION		HT02		HT03		OUT TRAFFIC	IN TRAFFIC
				HT01 IN TRAFFIC	HT01 OUT TRAFFIC	IN TRAFFIC	OUT TRAFFIC	IN TRAFFIC	OUT TRAFFIC		
81	10	5	5			9	80	3		1	
		5	6					15		2	
		7	7			12	12			8	
		8	8			6	13	23		6	
		9	9			4	6	7		9	
		10	10			12	7	8		2	
		11	11			6	9	2		7	
		12	12			6	14	13		5	
		13	13			5	5	4		7	
		14	14			9	15	8		5	
		15	15			42	7			15	
		16	16			9	12	8		18	
		17	17			46	1	12		20	
		18	18			3	1	6		8	
		19	19			3	0	1		2	
		20	20			2	2	2		4	
		21	21			3	1	1		1	
		22	22			2	8	2		1	
		23	23			8	2	4		3	
		24	24			0	0	2		2	
		1	1			0	0	0		0	
		2	2			0	0	0		0	

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C-3 STEVENS RECORDER TRAFFIC COUNT
JUNE 1981 - NOVEMBER 1981

YEAR	MONTH	DAY	HOUR	LOCATION				BT02				BT03			
				BT01	IN	OUT	TRAFFIC	IN	TRAFFIC	OUT	TRAFFIC	IN	TRAFFIC	OUT	TRAFFIC
81	10	6	3					6	0			0	0	1	
			4					0	1			0	0	0	
			5					0	0			2	2	0	
			6					5	75						
			7					13	10						
			8					23	13						
			9												
		23	10	38			122								
			11	60			139								
			12	17			111								
			13	14			124								
			14	7			121								
			15	3			112								
			16	4			123								
			17	11			116								
			18	0			93								
			19	2			96								
			20	0			109								
			21	0			93								
			22	0			91								
			23	7			92								
			24	7			119								
			25	4			110								
			26	6			93								
			27	12			111								
			28	5			97								
			29	31			97								
			30	35			97								
			31	25			136								
			1	28			102								
			2	46			93								
			3	43			106								
			4	42			90								
			5	19			105								
			6	13			100								
			7	16			121								
			8	2			105								
			9	4			130								
			10	3			106								

C-4 STEVENS RECORDER TRAFFIC COUNT
JUNE 1981 - NOVEMBER 1981

YEAR	MONTH	DAY	HOUR	LOCATION		BT01		BT02		BT03	
				IN	OUT	IN	OUT	IN	OUT	IN	OUT
81	10	25	1	3	108						
			2	0	127						
			3	0	111						
			4	0	117						
			5	0	126						
			6	2	125						
			7	4	114						
			8		114						
			9	12	98						
			10	20	117						
			11	11	199						
			12	23	46						
			13	38	73						
			14	34	162						
			15	33	155						
			16	36	130						
			17	44	113						
			18	45	115						
			19	51	66						
			20	22	96						
			21	6	91						
			22	0	94						
			23	4	89						
			24	1	111						
			1	8	88						
			2	1	96						
			3	0	113						
			4	0	104						
			5	2	88						
			6	3	174						
			7	4	125						
			8	14	123						
			9	17	117						
			10	33	126						
			11	21	135						
			12	50	124						
			13	39	557						
			14	45	802						
			15	35	816						
			16	34	173						
			17	62	149						
			18	60	3						
										9	18

C-H STEVENS RECORDER TRAFFIC COUNT
JUNE 1981 - NOVEMBER 1981

YEAR	MONTH	DAY	HOUR	LOCATION		BT01		BT02		BT03	
				IN	OUT	IN	OUT	IN	OUT	IN	OUT
81	10	25	18	55	5					5	15
			19							2	3
			20	14	153					3	0
			21	0	0					5	2
			22	7	0					4	1
			23	1	1					2	2
			24	3	1					0	2
		27	1	4	0					0	1
			2	4	2					0	0
			3	1	0					0	0
			4	1	0					0	2
			5	1	2					3	0
			6	0	0					24	2
			7	0	0					27	0
			8	0	0					9	9
			9	28	37					11	4
			10	27	13					12	19
			11	35	20					15	8
			12	32	22					9	10
			13	43	23					14	15
			14	41	32					12	9
			15	33	22					8	19
			16	36	19					10	22
			17	80	15					4	23

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C-H STEVENS RECORDER TRAFFIC COUNT
JUNE 1981 - NOVEMBER 1981

YEAR	MONTH	DAY	HOUR	LOCATION				BT02		BT03	
				BT01 IN	TRAFFIC	OUT	TRAFFIC	IN	OUT	IN	OUT
81	10	27	18	64	14					3	20
			19	48	14					2	7
			20	18	6					4	1
			21	4	8					3	0
			22	9	12					3	0
			23	2	7					3	1
			24	3	2					3	4
		28	1	5	0					0	0
			2	1	1					0	0
			3	0	0					0	0
			4	0	1					0	0
			5	0	4					5	2
			6	1	19					27	1
			7	5	71					20	3
			8	16	55					10	6
			9	15	22					17	5
			10	27	39					18	11
			11	43	26					6	14
			12	36	24					13	14
			13	32	29					12	8
			14	42	26					14	11
			15	45	22						

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C-H STEVENS RECORDER TRAFFIC COUNT
JUNE 1981 - NOVEMBER 1981

YEAR	MONTH	DAY	HOUR	LOCATION		BT02		BT03	
				BT01 IN	OUT	IN	OUT	IN	OUT
81	10	28	15					17	21
			16	33	14			7	27
			17	85	15			4	18
			18	74	14			4	12
			19	63	52			3	5
			20	33	0			0	0
			21	16	36			1	1
			22	14	13			2	0
			23	9	15			4	1
			24	7	5			0	1
		29	1	7	2			0	2
			2	4	1			0	0
			3	4	1			1	0
			4	1	1			0	0
			5	2	1			4	1
			6	5	25			22	2
			7	8	65			24	5
			8	20	62			15	14
			9	34	43			16	5
			10	20	41			19	9
			11	36	31			8	15
			12	24	57			12	11

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C-H STEVENS RECORDER TRAFFIC COUNT
JUNE 1981 - NOVEMBER 1981

YEAR	MONTH	DAY	HOUR	LOCATION		BT01		BT02		BT03	
				IN	OUT	IN	OUT	IN	OUT	IN	OUT
81	10	29	13	33	50					23	12
			14	49	39					15	10
			15	54	37					22	15
			16	50	25					17	27
			17	78	27					7	26
			18	72	133					7	8
			19	149	154					5	9
			20	19	43					8	2
			21	11	12					5	5
			22	15	14					4	0
			23	6	6					4	1
			24	6	6					2	3
		30	1	9	9					0	1
			2	5	5					0	0
			3	3	3					0	1
			4	2	0					0	0
			5	0	8					1	0
			6	8	29					20	3
			7	30	121					15	18
			8	14	39					19	9
			9	40	25					26	8
			10	0	0						

C-4 STEVENS RECORDER TRAFFIC COUNT
JUNE 1981 - NOVEMBER 1981

YEAR		MONTH	DAY	HOUR	LOCATION		HT02		HT03				
81	10				HT01	OUT	IN	OUT	IN	OUT			
					TRAFFIC	TRAFFIC	TRAFFIC	TRAFFIC	TRAFFIC	TRAFFIC			
		30		10					23	12			
				11	36	36			14	24			
				12	58	58			15	8			
				13	52	52			17	15			
				14					21	18			
				15					22	18			
				16					11	31			
				17					10	10			
				18					17	17			
				19					5	5			
				20					3	4			
				21					3	1			
				22					9	1			
				23					2	1			
				24					2	1			
				1					1	5			
				2					0	3			
				3					0	0			
				4					2	4			
				5					4	4			
				6					4	4			
				7					5	8			
				8					5	9			
				9					8	5			
				10					14	13			
				11					14	4			
				12					14	16			
				13					17	14			
				14					12	12			
				15					19	16			
				16					13	14			
				17					3	18			
				18					3	1			
				19					0	1			
				20					2	1			
				21					2	1			
				22					2	1			
				23					1	8			
				24					0	0			
				1					1	0			
				2					1	0			
				3					1	0			
				4					1	0			
				5					1	0			
				6					1	0			
				7					1	0			
				8					1	0			
				9					1	0			
				10					1	0			
				11					1	0			
				12					1	0			
				13					1	0			
				14					1	0			
				15					1	0			
				16					1	0			
				17					1	0			
				18					1	0			
				19					1	0			
				20					1	0			
				21					1	0			
				22					1	0			
				23					1	0			
				24					1	0			
				1					1	0			
				2					1	0			
				3					1	0			
				4					1	0			
				5					1	0			
				6					1	0			
				7					1	0			
				8					1	0			
				9					1	0			
				10					1	0			
				11					1	0			
				12					1	0			
				13					1	0			
				14					1	0			
				15					1	0			
				16					1	0			
				17					1	0			
				18					1	0			
				19					1	0			
				20					1	0			
				21					1	0			
				22					1	0			
				23					1	0			
				24					1	0			
				1					1	0			
				2					1	0			
				3					1	0			
				4					1	0			
				5					1	0			
				6					1	0			
				7					1	0			
				8					1	0			
				9					1	0			
				10					1	0			
				11					1	0			
				12					1	0			
				13					1	0			
				14					1	0			
				15					1	0			
				16					1	0			
				17					1	0			
				18					1	0			
				19					1	0			
				20					1	0			
				21					1	0			
				22					1	0			
				23					1	0			
				24					1	0			
				1					1	0			
				2					1	0			
				3					1	0			
				4					1	0			
				5					1	0			
				6					1	0			
				7					1	0			
				8					1	0			
				9					1	0			
				10					1	0			
				11					1	0			
				12					1	0			
				13					1	0			
				14					1	0			
				15					1	0			
				16					1	0			
				17					1	0			
				18					1	0			
				19					1	0			
				20					1	0			
				21					1	0			
				22					1	0			
				23					1	0			
				24					1	0			
				1					1	0			
				2					1	0			
				3					1	0			
				4					1	0			
				5					1	0			
				6					1	0			
				7					1	0			
				8					1	0			
				9					1	0			
				10					1	0			
				11					1	0			
				12					1	0			
				13					1	0			
				14					1	0			
				15					1	0			
				16					1	0			
				17					1	0			
				18					1	0			
				19					1	0			
				20					1	0			
				21					1	0			
				22					1	0			
				23					1	0			
				24					1	0			
				1					1	0			
				2					1	0			
				3					1	0			
				4					1	0			
				5					1	0			
				6					1	0			
				7					1	0			
				8					1	0			
				9					1	0			
				10					1	0			
				11					1	0			
				12					1	0			
				13					1	0			
				14					1	0			
				15					1	0			
				16					1	0			
				17					1	0			
				18					1	0			
				19					1	0			
				20					1	0			
				21					1	0			
				22					1	0			
				23					1	0			
				24					1	0			
				1					1	0			
				2					1	0			
				3					1	0			
				4					1	0			
				5					1	0			
				6					1	0			
				7					1	0			
				8					1	0			
				9					1	0			
				10					1	0			
				11					1	0			
				12					1	0			
				13					1	0			
				14					1	0			
				15					1	0			
				16					1	0			
				17					1	0			
				18					1	0			
				19					1	0			
				20					1	0			
				21					1	0			
				22					1	0			
				23					1	0			
				24					1	0			
				1					1	0			
				2					1	0			
				3					1	0			
				4					1	0			
				5					1	0			
				6					1	0			
				7					1	0			
				8					1	0			
				9					1	0			
				10					1	0			

C-H STEVENS RECORDER TRAFFIC COUNT
JUNE 1981 - NOVEMBER 1981

YEAR	MONTH	DAY	HOUR	LOCATION				BT02				BT03			
				BT01	IN	OUT	TRAFFIC	IN	TRAFFIC	OUT	TRAFFIC	IN	TRAFFIC	OUT	TRAFFIC
81	11	1	2									1		0	
			3									0		0	
			4									4		3	
			5									14		7	
			6									26		2	
			7									16		5	
			8									12		1	
			9									12		3	
			10									13		9	
			11									5		1	
			12									15		0	
			13									18		5	
			14									12		3	
			15									18		1	
			16									12		6	
			17									9		7	
			18									6		1	
			19									5		3	
			20									3		2	
			21									4		1	
			22									0		7	
			23									0		0	
			24									0		0	
			1									0		2	
			2									1		3	
			3									2		8	
			4									3		6	
			5									5		9	
			6									2		1	
			7									5		1	
			8									2		1	
			9									1		5	
			10									6		2	
			11									1		1	
			12									1		1	
			13									1		4	
			14									1		5	
			15									2		2	
			16									1		0	
			17									1		4	
			18									2		7	
			19									1		3	
			20									1		2	
			21									2		7	
			22									6		3	
			23									9		8	
			24									4		3	
			25									3		6	
			26									5		9	
			27									2		1	
			28									5		1	
			29									2		1	
			30									1		5	
			31									1		1	
			1									1		1	
			2									1		1	
			3									1		1	
			4									1		1	
			5									1		1	
			6									1		1	
			7									1		1	
			8									1		1	
			9									1		1	
			10									1		1	
			11									1		1	
			12									1		1	
			13									1		1	
			14									1		1	
			15									1		1	
			16									1		1	
			17									1		1	
			18									1		1	
			19									1		1	
			20									1		1	
			21									1		1	
			22									1		1	
			23									1		1	
			24									1		1	
			25									1		1	
			26									1		1	
			27									1		1	
			28									1		1	
			29									1		1	
			30									1		1	
			31									1		1	

C-H STEVENS RECORDER TRAFFIC COUNT
JUNE 1981 - NOVEMBER 1981

YEAR	MONTH	DAY	HOUR	LOCATION		BT02		BT03		OUT TRAFFIC	IN TRAFFIC
				HT01	HT01	IN	OUT	IN	OUT		
81	11	2	21					4	1		
			22					5	2		
		3	23					2	0		
			24					0	1		
		4	1					0	0		
			2					0	0		
		5	3					2	1		
			4					2	0		
		6	5					15	15		
			6					3	6		
		7	7					22	15		
			8					12	4		
		8	9					20	16		
			10					16	17		
		9	11					17	13		
			12					17	7		
		10	13					13	6		
			14					6	1		
		11	15					6	1		
			16					4	2		
		12	17					2	2		
			18					0	0		
		13	19					1	5		
			20					3	3		
		14	21					3	3		
			22					3	3		
		15	23					3	3		
			24					3	3		
		16	1					3	3		
			2					3	3		
		17	3					3	3		
			4					3	3		
		18	5					3	3		
			6					3	3		
		19	7					3	3		
			8					3	3		
		20	9					3	3		
			10					3	3		
		21	11					3	3		
			12					3	3		
		22	13					3	3		
			14					3	3		
		23	15					3	3		
			16					3	3		
		24	17					3	3		
			18					3	3		
		25	19					3	3		
			20					3	3		
		26	21					3	3		
			22					3	3		
		27	23					3	3		
			24					3	3		
		28	25					3	3		
			26					3	3		
		29	27					3	3		
			28					3	3		
		30	29					3	3		
			30					3	3		
		31	31					3	3		
			32					3	3		

C-B STEVENS RECORDER TRAFFIC COUNT
JUNE 1981 -- NOVEMBER 1981

YEAR	MONTH	DAY	HOUR	LOCATION				BT02		BT03		BT03	
				BT01 IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
81	11	4	17							8	33		
			17							6	46		
			18							10	25		
			19							13	9		
			20							5	5		
			21							2	2		
			22							0	1		
			23							1	3		
			24							0	0		
			1							0	0		
			2							0	0		
			3							0	0		
			4							0	0		
			5							0	0		
			6							0	0		
			7							3	9		
			8							2	2		
			9							2	9		
			10							1	2		
			11							13	20		
			12							15	17		
			13							11	9		
			14							15	16		
			15							13	13		
			16							7	23		
			17							5	5		
			18							4	2		
			19							1	2		
			20							1	2		
			21							3	1		
			22							2	4		
			23							2	2		
			24							2	2		
			1							2	2		
			2							0	0		
			3							0	0		
			4							8	10		
			5							13	29		
			6							2	2		
			7							1	1		
			8							17	12		
			9							19	14		
			10							2	2		
			11							0	0		
			12							0	0		
			13							0	0		
			14							0	0		
			15							0	0		
			16							0	0		
			17							0	0		
			18							0	0		
			19							0	0		
			20							0	0		
			21							0	0		
			22							0	0		
			23							0	0		
			24							0	0		
			1							0	0		
			2							0	0		
			3							0	0		
			4							0	0		
			5							0	0		
			6							0	0		
			7							0	0		
			8							0	0		
			9							0	0		
			10							0	0		
			11							0	0		
			12							0	0		
			13							0	0		
			14							0	0		
			15							0	0		
			16							0	0		
			17							0	0		
			18							0	0		
			19							0	0		
			20							0	0		
			21							0	0		
			22							0	0		
			23							0	0		
			24							0	0		
			1							0	0		
			2							0	0		
			3							0	0		
			4							0	0		
			5							0	0		
			6							0	0		
			7							0	0		
			8							0	0		
			9							0	0		
			10							0	0		
			11							0	0		
			12							0	0		
			13							0	0		
			14							0	0		
			15							0	0		
			16							0	0		
			17							0	0		
			18							0	0		
			19							0	0		
			20							0	0		
			21							0	0		
			22							0	0		
			23							0	0		
			24							0	0		
			1							0	0		
			2							0	0		
			3							0	0		
			4							0	0		
			5							0	0		
			6							0	0		
			7							0	0		
			8							0	0		
			9							0	0		
			10							0	0		
			11							0	0		
			12							0	0		
			13							0	0		
			14							0	0		
			15							0	0		
			16							0	0		
			17							0	0		
			18							0	0		
			19							0	0		
			20							0	0		
			21							0	0		
			22							0	0		
			23							0	0		
			24							0	0		
			1							0	0		
			2							0	0		
			3							0	0		
			4							0	0		
			5							0	0		
			6							0	0		
			7							0	0		
			8							0	0		
			9							0	0		
			10							0	0		
			11							0	0		
			12							0	0		
			13							0	0		
			14							0	0		
			15							0	0		
			16							0	0		
			17							0	0		
			18							0	0		
			19							0	0		
			20							0	0		
			21							0	0		
			22							0	0		
			23							0	0		
			24							0	0		
			1							0	0		
			2							0	0		
			3							0	0		
			4							0	0		
			5							0	0		
			6							0	0		
			7							0	0		
			8							0	0		
			9							0	0		
			10							0	0		
			11							0	0		
			12							0	0		
			13							0	0		
			14							0	0		
			15							0	0		
			16							0	0		
			17							0	0		
			18							0	0		
			19							0	0		
			20							0	0		
			21							0	0	</	

C-B STEVENS RECORDER TRAFFIC COUNT
JUNE 1981 - NOVEMBER 1981

YEAR	MONTH	DAY	HOUR	LOCATION		HT02	OUT	HT03	OUT	HT03	OUT
				HT01	IN	IN	TRAFFIC	IN	TRAFFIC	IN	TRAFFIC
81	11	6	10					11		11	14
			11					12		17	7
			12					7		7	
			13					9		11	11
			14					10		10	16
			15					3		16	21
			16					11		25	1
			17					4		10	2
			18					4		2	4
			19					2		1	1
			20					3		1	0
			21					7		1	7
			22					1		0	0
			23					1		0	0
			24					1		0	0
			1					0		2	0
			2					0		0	0
			3					1		0	6
			4					5		9	5
			5					1		5	5
			6					8		6	4
			7					10		5	5
			8					8		5	5
			9					10		6	4
			10					13		11	16
			11					9		10	16
			12					11		12	9
			13					5		4	3
			14					5		2	1
			15					3		6	1
			16					1		0	0
			17					5		1	0
			18					5		0	0
			19					3		1	0
			20					2		0	0
			21					2		0	0
			22					2		0	0
			23					4		1	0
			24					1		0	0
			1					2		0	0
			2					3		0	0

C-H STEVENS RECORDER TRAFFIC COUNT
JUNE 1981 - NOVEMBER 1981

YEAR	MONTH	DAY	HOUR	LOCATION		BT01		BT02		BT03		OUT TRAFFIC	OUT TRAFFIC
				IN	OUT	IN	OUT	IN	OUT	IN	OUT		
81	11	8	5									0	
			6									0	
			7									3	
			8									4	
			9									4	
			10									5	
			11									4	
			12									6	
			13									4	
			14									6	
			15									13	
			16									6	
			17									4	
			18									7	
			19									8	
			20									7	
			21									4	
			22									3	
			23									1	
			24									4	
			1									6	
			2									0	
			3									0	
			4									0	
			5									0	
			6									0	
			7									1	
			8									9	
			9									7	
			10									4	
			11									3	
			12									7	
			13									8	
			14									12	
			15									6	
			16									11	
			17									17	
			18									23	
			19									12	
			20									5	
			21									2	
			22									4	
			23									0	
			24									3	
			1									5	
			2									2	
			3									4	
			4									0	
			5									0	
			6									0	
			7									0	
			8									1	
			9									9	
			10									7	
			11									4	
			12									3	
			13									7	
			14									8	
			15									12	
			16									6	
			17									11	
			18									17	
			19									23	
			20									12	
			21									5	
			22									2	
			23									4	
			24									0	
			1									3	
			2									5	
			3									2	
			4									4	
			5									0	
			6									0	
			7									0	
			8									3	
			9									4	
			10									0	
			11									3	

C-H STEVENS RECORDER TRAFFIC COUNT
JUNE 1981 - NOVEMBER 1981

YEAR	MONTH	DAY	HOUR	LOCATION		HT01		HT02		HT03	
				IN	OUT	IN	OUT	IN	OUT		
81	11	9	24	1	3	0	0	0	0	0	0
		10	1	2	0	0	0	0	0	0	0
			2	3	0	0	0	0	0	0	0
			3	4	0	0	0	0	0	0	0
			4	5	3	2	3	2	0	2	2
			5	6	19	2	19	2	0	2	2
			6								

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3.5 Geology

The surface geology report was presented in Quarterly Data Report #5 and in the Annual Summary and Trends Report.

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4.0 Data Automation

The environmental data base at present is partially manual and partially computerized. For purposes of analysis, data specificity, data security, and data archiving, the data base is being further computerized. It is the intent that all "indicator variables" be entered into RAMIS (Rapid Access Management Information System). Toward this end computer codes have been designated for all environmental station locations.

This section presents the status of automated data base, station location data, and a cross-reference list of four-digit computer codes and station monitoring codes.

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4.1 Automation Status

This section presents the status of the automated data base for the C-b Tract environmental data on the Occidental Petroleum Corporation computer system in Houston, Texas.

RAMIS II is a computerized data base management system (DBMS) used by Occidental Oil Shale, Inc. on the C-b Shale Oil Project via the Occidental Computer Center in Houston, Texas. C-b Shale Oil Tract environmental data are being prepared and entered into RAMIS DBMS as a means of making relevant data available for subsequent retrievals for use in reports and impact analyses. The use of this system provides an economical way to store and retrieve selected data in desired formats for reports and for input to analytic models requiring the data. Data are also archived within this system and through magnetic tapes containing the source raw data.

The following environmental data are entered into RAMIS DBMS as of November 1981.

Water Quality	
Springs and Seeps	October 1974 thru November 1981
Alluvial Wells	October 1974 thru November 1981
Upper Aquifer Wells	October 1974 thru November 1981
Lower Aquifer Wells	October 1974 thru November 1981
Wells Water Levels	
Water Levels	October 1974 thru November 1981
Water Augmentation Plan	
Springs and Seeps	July 1979 thru November 1981
Upper Aquifer Wells	August 1979 thru November 1981
Lower Aquifer Wells	August 1979 thru November 1981
Precipitation	January 1979 thru November 1981
National Pollutant Discharge Elimination System	
Water Quality Data	July 1979 thru November 1981
Water Usage	June 1980 thru November 1980
Well Reinjection	March 1981 thru November 1981
Air Quality	
Small Station (Station AD42, AD56)	
October 1974 thru August 1980	
Large Trailer (Station AB20)	
October 1974 thru October 1981	
Large Trailer (Station AB23)	
October 1974 thru October 1981	
Meteorological Tower (Station AA23)	
October 1974 thru October 1981	
Traffic	February 1980 thru November 1981

4.1 Automation Status (Continued)

Biology

Microclimate	October 1974 thru November 1981
Deer Kill	October 1977 thru November 1981
Deer Count	September 1977 thru November 1981
Avifauna	1977 thru 1981

The status for the files are shown graphically in figures 4.1-1 through 4.1-9. File descriptions for the 20 files that reside in the RAMIS data base are shown in Tables 4.1-1 through 4.1-20.

Data collected and analyzed by USGS for stream flow and stream water quality are stored in government computer data bases in Reston, Virginia. These data bases (WATSTOR) and (NAWDEX) are accessed by dialing computer communications for retrievals of data to the Occidental Grand Junction computers for printing and analyses.

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Figure 4.1-1

WATER QUALITY MONITORING/DATABASE STATUS
ALLUVIAL WELLS

	YR		
	81		
	MO		
	5	7	10
LOC	-----		
WA01	X	X	X
WA02	X	X	X
WA03		X	X
WA05		X	X
WA06		X	X
WA07		X	X
WA08		X	X
WA09	X	X	X
WA12	X	X	X
WA56		X	X

WATER QUALITY MONITORING/DATABASE STATUS
COMPOSITE WELLS

	YR		
	81		
	MO		
	7		
LOC	-----		
WV37	X		

WATER QUALITY MONITORING/DATABASE STATUS
POND SEEPAGE WELLS

	YR			
	81			
	MO			
	6	8	9	10
LOC	-----			
WW12	X			
WW13	X	X	X	X
WW22	X	X	X	X

WATER QUALITY MONITORING/DATABASE STATUS
DEEP WELLS

111-357

Figure 4.1-1 (continued)

WATER QUALITY MONITORING/DATABASE STATUS
POINTS

LOC	YEAR									
	1	2	3	4	5	6	7	8	9	10
WS01	X	X								X
WS02	X	X		X						X
WS03	X	X								X
WS04	X	X		X						X
WS05	X	X		X						X
WS07	X	X		X						X
WS08	X	X								X
WS09	X	X		X						X
WS10	X	X		X						X
WS11	X	X		X						X
WS12	X	X		X						X
WS13	X	X		X						X

WATER QUALITY MONITORING/DATABASE STATUS
SHAFT POINTS

LOCATION	YEAR									
	1	2	3	4	5	6	7	8	9	10
WS40										X

WATER QUALITY MONITORING/DATABASE STATUS
DISCHARGE POINTS

LOCATION	YEAR									
	1	2	3	4	5	6	7	8	9	10
WS40	X	X	X	X	X	X	X	X	X	X
WS41	X	X	X	X	X	X	X	X	X	X
WS42	X	X	X	X	X	X	X	X	X	X
WS43	X	X	X	X	X	X	X	X	X	X
WS44	X	X	X	X	X	X	X	X	X	X

WATER QUALITY MONITORING/DATABASE STATUS
SEMI-ANNUAL DISCHARGE POINTS

LOCATION	YEAR									
	1	2	3	4	5	6	7	8	9	10
WS40										X

Figure 4.1-2

HYDROLOGY MONITORING DATABASE STATUS
SPRING FLOWS

LOC	YR										
	1	2	3	4	5	6	7	8	9	10	11
WS01	X	X	X	X	X	X	X	X	X	X	X
WS02	X	X	X	X	X	X	X	X	X	X	X
WS03	X	X	X	X	X	X	X	X	X	X	X
WS04	X	X	X	X	X	X	X	X	X	X	X
WS06	X	X	X	X	X	X	X	X	X	X	X
WS07	X	X	X	X	X	X	X	X	X	X	X
WS08	X	X	X	X	X	X	X	X	X	X	X
WS09	X	X	X	X	X	X	X	X	X	X	X
WS10	X	X	X	X	X	X	X	X	X	X	X
WS11	X	X	X	X	X	X	X	X	X	X	X
WS12	X	X	X	X	X	X	X	X	X	X	X
WS21	X	X	X	X	X	X	X	X	X	X	X
WS22	X	X	X	X	X	X	X	X	X	X	X
WS23	X	X	X	X	X	X	X	X	X	X	X
WS24	X	X	X	X	X	X	X	X	X	X	X
WS25	X	X	X	X	X	X	X	X	X	X	X
WS26	X	X	X	X	X	X	X	X	X	X	X
WS27	X	X	X	X	X	X	X	X	X	X	X
WS28	X	X	X	X	X	X	X	X	X	X	X
WS29	X	X	X	X	X	X	X	X	X	X	X
WS30	X	X	X	X	X	X	X	X	X	X	X
WS31	X	X	X	X	X	X	X	X	X	X	X
WS32	X	X	X	X	X	X	X	X	X	X	X
WS33	X	X	X	X	X	X	X	X	X	X	X
WS34	X	X	X	X	X	X	X	X	X	X	X
WS35	X	X	X	X	X	X	X	X	X	X	X
WS36	X	X	X	X	X	X	X	X	X	X	X
WS37	X	X	X	X	X	X	X	X	X	X	X
WS66	X	X	X	X	X	X	X	X	X	X	X

Figure 4.1-31

HYDROLOGY MONITORING/DATABASE STATUS
ALLOTTAL FILL STATUS

YR													
91													
90													
0		1	2	3	4	5	6	7	8	9	10	11	
LOC													
WA001		X	X	X	X	X	X	X	X	X	X	X	
WA002		X	X	X	X	X	X	X	X	X	X	X	
WA003		X	X	X	X		X	X	X	X	X	X	
WA004	X	X	X	X	X				X	X	X		
WA005		X	X	X	X		X	X	X	X	X	X	
WA006		X	X	X	X		X	X	X	X	X	X	
WA007		X	X	X	X		X	X	X	X	X	X	
WA008		X	X	X	X		X	X	X	X		X	
WA009		X	X	X	X	X	X	X	X	X	X	X	
WA010	X	X	X	X	X			X	X	X	X	X	
WA011		X	X	X	X		X	X	X	X	X		
WA012		X	X	X	X	X	X	X	X	X	X	X	
WA013	X	X	X	X	X			X	X	X	X		
WA055			X	X			X		X	X	X	X	
WA056		X	X	X			X	X	X	X	X	X	

HYDROLOGY MONITORING/DATABASE STATUS
COMMON SITE FILL LEVELS

YR											
		1	2	3	4	5	6	7	8	9	10
LOC											
WV001	X	X	X	X	X	X	X	X	X	X	X
WV002	X	X	X	X	X	X	X	X	X	X	X
WV003	X	X	X	X	X	X	X	X	X	X	X
WV004	X	X	X	X	X	X	X	X	X	X	X
WV005	X	X	X	X	X	X	X	X	X	X	X
WV006								X	X	X	X
WV007	X	X	X	X	X	X	X	X	X	X	X
WV008								X	X	X	X

HYDROLOGY MONITORING/DATABASE STATUS
COMMON SITE FILL LEVELS

YR												
		1	2	3	4	5	6	7	8	9	10	11
LOC												
WV001	X	X	X	X	X	X	X	X	X	X	X	X
WV002	X	X	X	X	X	X	X	X	X	X	X	X

Figure 4.1-3 (continued)

HYDROLOGY MONITORING DATA BASE - RESULTS
DEEP CELL LEVELS

	1	2	3	4	5	6	7	8	9	10	11
LOC											
MW01	X	X	X	X	X	X					
MW02	X	X	X	X	X	X					
MW03	X	X	X	X	X	X					
MW12			X	X	X	X	X				
MW13			X	X	X	X					
WC17	X	X	X	X	X	X	X	X		X	X
WC01	X	X	X	X	X	X	X	X	X		X
WD01	X	X	X	X	X	X	X				
WD02	X	X	X	X	X	X	X	X	X	X	X
WD11		X	X	X	X	X	X	X	X	X	X
WD12		X	X	X	X	X	X	X	X	X	X
WD14	X	X	X	X	X	X	X	X	X	X	
WD15	X	X	X	X	X	X	X	X	X	X	
WD17	X	X	X	X	X	X	X	X		X	X
WD19	X	X	X	X	X	X	X	X	X		
WD19	X	X	X	X	X	X	X				
WD20	X	X	X	X	X	X	X	X	X	X	X
WD21	X	X	X	X	X	X	X	X	X	X	X
WD41	X	X	X	X	X	X	X	X	X	X	
WD51	X	X	X								
WD52	X	X	X	X	X	X	X	X	X		
WD57	X	X	X	X	X	X	X			X	X
WD61	X	X	X	X	X	X	X	X	X	X	X
WD80		X	X	X	X	X	X				
WD91	X	X	X	X	X	X	X	X	X		X
WF03	X	X	X	X	X	X	X	X	X	X	X
WF04	X	X	X	X	X	X	X				X
WF11	X	X	X	X	X	X	X		X	X	X
WF17	X	X	X	X	X	X					X
WF18	X	X	X	X	X	X	X	X	X	X	
WF20	X	X	X	X	X	X	X	X	X	X	X
WF21	X	X	X	X	X	X	X	X	X		X
WF41						X	X	X			
WF51	X	X	X			X	X	X	X	X	
WF52	X	X	X			X	X	X			
WF61	X	X	X			X	X	X		X	X
WF91	X	X				X	X				
WG12		X	X	X	X	X	X				
WG17	X	X	X	X							
WG18	X	X	X				X				
WG20	X	X									
WG21	X	X	X	X	X	X	X	X			
WG41	X	X	X	X	X	X	X	X			

(

(

(

Figure 4.1-3 (continued)

CONTINUOUS WELL LEVEL MONITORING/INCREASE STATUS

LOCATION	YEAR										
	81										
	MONTH										
	1	2	3	4	5	6	7	8	9	10	11
WA012			X	X	X	X	X				
WA001	X	X	X	X	X	X	X	X	X	X	X
WA002	X	X	X	X	X	X	X	X	X	X	X
WA003	X	X	X	X	X	X	X	X	X	X	X
WA005	X	X	X	X	X	X	X	X	X	X	X
WA006	X	X	X	X		X	X	X	X	X	X
WA007	X	X	X	X	X	X	X	X	X	X	X
WA008	X	X	X	X	X	X	X	X	X	X	X
WA009	X	X	X	X	X	X	X	X	X	X	X
WA112	X	X	X				X	X	X	X	X
WA555	X	X	X			X	X	X	X	X	X
WD112	X	X	X	X	X	X	X	X	X	X	X
WD119	X	X	X	X	X	X	X				
WD906	X	X	X		X	X	X				
WG112	X	X	X	X	X	X	X	X	X	X	X
WV37		X	X								
WW113	X	X	X	X	X	X	X	X	X		
WX32	X	X	X	X	X	X	X	X			
WX34				X	X	X	X	X			
WY44	X	X	X	X	X	X	X	X			

Figure 4.1-4

WELL LEVELS MONITORING/DATABASE STATUS
DURING REINJECTION AND SHAFT RECOVERY

	YD							
	R1							
	10							
	3	4	5	6	7	8	9	
CODE								
RPSI	X	X	X	X				
C201	X	X	X	X	X		X	
FLOW	X	X	X	X				
TPSI	X	X	X	X				
WD17	X	X	X	X				
WD41	X	X	X	X	X		X	
WD01	X	X	X	X	X			
WD02	X	X	X	X	X		X	
WD11	X	X	X	X	X		X	
WD12	X	X	X	X	X		X	
WD14	X	X	X	X	X		X	
WD15	X	X	X	X	X		X	
WD17	X	X	X	X	X			
WD18	X	X	X	X	X		X	
WD19	X	X	X	X	X		X	
WD20	X	X	X	X	X		X	
WD21	X	X	X	X	X		X	
WD41	X	X	X	X	X		X	
WD51	X	X	X					
WD52	X	X	X	X	X		X	
WD57	X	X	X	X	X			
WD61	X	X	X	X	X		X	
WD40	X	X	X	X	X		X	
WD41	X	X	X	X	X		X	
WF03	X	X	X	X	X		X	
WF04	X	X	X	X	X		X	
WF11	X	X	X	X	X		X	
WF17	X	X	X	X	X			
WF18	X	X	X	X	X		X	
WF20	X	X	X	X	X		X	
WF21	X	X	X	X	X		X	
WF41			X	X	X		X	
WF51	X	X	X	X	X		X	
WF52	X	X	X	X	X		X	
WF61	X	X	X	X	X		X	
WF41	X	X	X	X	X		X	
WG12	X	X	X	X	X		X	
WG17	X	X	X	X	X			
WG18	X	X	X	X	X		X	
WG21	X	X	X	X	X			
WG41	X	X	X	X	X			
WG51	X	X	X	X	X			
WG52	X	X	X	X	X			

Figure 4.1-4 (continued) ¹

WELL LEVELS MONITORING/DATABASE STATUS
DURING REINJECTION AND SHAFT RECOVERY

	YR							
	R1							
	MO							
	3	4	5	6	7	8	9	
CODE								
WG61	X	X	X	X	X			X
WG91	X	X	X	X	X			X
WH21	X	X	X	X	X			X
WV37	X	X	X	X	X			X
WV40			X	X	X	X		X
WW12				X	X			
WW13	X	X	X	X	X			X
WW22	X	X	X	X				X
WX32	X	X		X	X			X
WX34	X	X	X	X				X
WX44	X	X	X	X	X			X
WY44	X	X	X	X	X			X
WY45	X	X	X	X	X			X
WY46	X	X	X	X	X			X
WY51	X	X	X	X	X			

Figure 4.1-5

AIR QUALITY MONITORING/DATABASE STATUS

TRAILER	YEAR 81 MONTH									
	1	10	2	3	4	5	6	7	8	9
20	X	X	X	X	X	X	X	X	X	X
23	X	X	X	X	X	X	X	X	X	X

METEOROLOGICAL MONITORING/DATABASE STATUS

TOWER	YEAR 81 MONTH									
	1	10	2	3	4	5	6	7	8	9
123	X	X	X	X	X	X	X	X	X	X

INVERSION HEIGHT

TRAILER	YEAR 81 MONTH									
	1	10	2	3	4	5	6	7	8	9
20	X	X	X	X	X	X	X	X	X	X

Figure 4.1-5 (continued)

SUSPENDED PARTICULATE MONITORING/DATABASE STATUS

TRAILER	YEAR 81 MONTH										
	1	2	3	4	5	6	7	8	9	10	11
	<hr/>										
020	X	X	X	X	X	X	X	X	X	X	X
023	X	X	X	X	X	X	X	X	X	X	X
026											X
056	X	X	X	X	X	X	X	X	X	X	X

Figure 4.1-6

MECHANICAL WEATHER STATIONS MONITORING/DATABASE STATUS

STATION	YEAR 80 MONTH							
	1	2	3	4	5	6	7	8
	<hr/>							
AD42	X	X	X	X	X	X	X	X
AD56	X	X	X	X	X	X	X	X

Figure 4.1-7 |

TRAFFIC/DATA BASE STATUS

LOCATION	YEAR 81 MONTH										
	1	2	3	4	5	6	7	8	9	10	11
	<hr/>										
RT01	X	X	X	X	X	X	X	X	X	X	X
RT02	X	X	X	X	X	X	X	X	X	X	X
RT03	X	X	X	X	X	X	X	X	X	X	X

Figure 4.1-8 |

MICRO-CLIMATIC MONITORING/DATA BASE STATUS

STATION	YEAR 81 MONTH										
	1	2	3	4	5	6	7	8	9	10	11
	<hr/>										
MC01	X	X	X	X	X	X	X	X	X	X	X
MC02	X	X	X	X	X	X	X	X	X	X	X
MC03	X	X	X	X	X	X	X	X	X	X	X
MC04	X	X	X	X	X	X	X	X	X	X	X
MC05	X	X	X	X	X	X	X	X	X	X	X
MC06	X	X	X	X	X	X	X	X	X	X	X
MC07	X	X	X	X	X	X	X	X	X	X	X
MC08	X	X	X	X	X	X	X	X	X	X	X
MC09	X	X	X	X	X	X	X	X	X	X	X
MC10	X	X	X	X	X	X	X	X	X	X	X

Figure 4.1-9

DEER ROAD COUNT/DATA BASE STATUS

MILE	YEAR										
	COUNT										
	1	2	3	4	9	10	11				
RM39											
RM40											
RM41											
RM00											
RM02											
RM04											
RM05											
RM09											
RMJ4											
RM15											
RM16											
RM17											
RM18											
RM19											
RM20											
RM21											
RM22											
RM23											
RS06											
RS10											
RS12											
RS18											
RS20											
RV27											
RV33											
RV34											
RV35											
RV36											
RV37											
RV38											
RV39											
RV40											
RV41											

DEER ROAD COUNT/DATA BASE STATUS

MILE	YEAR										
	COUNT										
	1	2	3	4	9	10	11				
RM24											
RM25											
RM26											
RM27											
RM28											
RM29											
RM30											
RM31											
RM32											
RM33											
RM34											
RM35											
RM36											
RM37											
RM38											
RM39											
RM40											
RM41											
RM42											
RM43											
RM44											
RM45											
RM46											
RM47											
RM48											
RM49											
RM50											
RM51											
RM52											
RM53											
RM54											
RM55											
RM56											
RM57											
RM58											
RM59											
RM60											
RM61											
RM62											
RM63											
RM64											
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RM66											
RM67											
RM68											
RM69											
RM70											
RM71											
RM72											
RM73											
RM74											
RM75											
RM76											
RM77											
RM78											
RM79											
RM80											
RM81											
RM82											
RM83											
RM84											
RM85											
RM86											
RM87											
RM88											
RM89											
RM90											
RM91											
RM92											
RM93											
RM94											
RM95											
RM96											
RM97											
RM98											
RM99											
RM100											

Figure 4.1-9 (continued)

DEER ROAD KILL/DATA BASE STATUS

MILE	YEAR										
	1	2	3	4	5	6	7	8	9	10	11
0000	X										
0001	X										
0002	X										
0003	X										
0004	X										
0005	X										
0006	X										
0007	X										
0008	X										
0009	X										
0010	X										
0011	X										
0012	X										
0013	X										
0014	X										
0015	X										
0016	X										
0017	X										
0018	X										
0019	X										
0020	X										
0021	X										
0022	X										
0023	X										
0024	X										
0025	X										
0026	X										
0027	X										
0028	X										
0029	X										
0030	X										
0031	X										
0032	X										
0033	X										
0034	X										
0035	X										
0036	X										
0037	X										
0038	X										
0039	X										
0040	X										
0041	X										

BIRD CENSUS/DATA BASE STATUS

TRANSFCT	YEAR				
	1	2	3	4	5
1	X				
2	X				
3	X				
4	X				
5	X				

Table 4.1-1

DESCRIPTION FOR RAMIS FILE WTRQLT
01/13/82

LIST	FIELDNAME	SYNONYM	LEVEL	LEVEL TYPE	SEGMENT FACTOR	TYPE	LENGTH
1	LOC	LOCATION	1	S	10	A	4
2	YR	YEAR	2	S	1	I	2
3	MO	MONTH	3	S	1	I	2
4	DY	DAY	4	S	1	I	2
5	TALK	TOTALK	4	S	1	F	7.1
6	AL	ALUMINUM	4	S	1	F	6.3
7	ARS	ARSENIC	4	S	1	F	5.3
8	FCOLIF	FCOLIF	4	S	1	F	6.2
9	BA	BARIUM	4	S	1	F	5.2
10	HC03	BICARBONTE	4	S	1	F	7.1
11	BOD	BOD	4	S	1	F	6.1
12	B	BORON	4	S	1	F	6.2
13	BR	BROMIDE	4	S	1	F	6.3
14	TCOLIF	TCOLIF	4	S	1	F	7.1
15	CD	CADIUM	4	S	1	F	6.3
16	CA	CALCIUM	4	S	1	F	6.1
17	C03	CARBONATE	4	S	1	F	6.1
18	CL	CHLORIDE	4	S	1	F	7.1
19	CR	CHROMIUM	4	S	1	F	6.3
20	COD	COD	4	S	1	F	7.1
21	CU	COPPER	4	S	1	F	6.3
22	DO	DISSOXY	4	S	1	F	4.1
23	DOC	DOC	4	S	1	F	5.1
24	LAS	LASSURF	4	S	1	F	6.2
25	F	FLORIDE	4	S	1	F	6.2
26	HARD	HARDNESS	4	S	1	F	7.1
27	FE	IRON	4	S	1	F	5.2
28	KJN	KJELDNIT	4	S	1	F	5.2
29	PB	LEAD	4	S	1	F	6.3
30	LI	LITHIUM	4	S	1	F	5.2
31	MG	MAGNESIUM	4	S	1	F	5.1
32	MN	MANGANESE	4	S	1	F	6.3
33	HG	MERCURY	4	S	1	D	8.5
34	MOLY	MOLYBDENUM	4	S	1	F	6.3
35	NI	NICKEL	4	S	1	F	6.3
36	N03	NITRATE	4	S	1	F	6.2
37	OLGR	OILGREASE	4	S	1	F	5.1
38	S203	S203	4	S	1	F	5.1
39	PH	PH	4	S	1	F	3.1
40	K	POTASSIUM	4	S	1	F	5.1
41	RA	ALPHA	4	S	1	F	5.1
42	BTR	BETA	4	S	1	F	5.1
43	RR	RADIUM226	4	S	1	F	5.1
44	SE	SELENIUM	4	S	1	F	6.3
45	AG	SILVER	4	S	1	F	6.3
46	NA	SODIUM	4	S	1	F	7.1
47	TDS	TDS	4	S	1	F	7.1
48	SOLS	SOLSOLIDS	4	S	1	F	7.1

Table 4.1-1 (continued)

DESCRIPTION FOR RAMIS FILE WTRQLT
01/13/82

LIST	FIELDNAME	SYNONYM	LEVEL	LEVEL TYPE	SEGMENT FACTOR	TYPE	LENGTH
49	SPC	SPECCOND	4	S	1	F	7.1
50	SR	STRONTIUM	4	S	1	F	4.1
51	S04	SULFATE	4	S	1	F	6.1
52	TEMP	TEMP	4	S	1	F	4.1
53	ZN	ZINC	4	S	1	F	6.3
54	TOC	TOC	4	S	1	F	5.1
55	PHEN	PHENOLS	4	S	1	F	6.4
56	CYAN	CYANIDE	4	S	1	F	6.3
57	NH3	AMMONIA	4	S	1	D	8.3
58	PST	PHOSPHATE	4	S	1	F	6.2
59	SI02	SILICA	4	S	1	F	6.1
60	U	URANIUM	4	S	1	F	5.3
61	SUSS	SUSSOLID	4	S	1	F	7.1
62	TH	THORIUM	4	S	1	F	6.3
63	CS	CESIUM	4	S	1	F	6.3
64	I	IODINE	4	S	1	F	6.3
65	SB	ANTIMONY	4	S	1	F	6.3
66	ZR	ZIRCONIUM	4	S	1	F	6.3
67	Y	YTTRIUM	4	S	1	F	5.3
68	RB	RUBIDIUM	4	S	1	F	6.3
69	GE	GERMAIUM	4	S	1	F	6.3
70	GA	GALLIUM	4	S	1	F	6.3
71	TI	TITANIUM	4	S	1	F	6.3
72	SC	SCANDIUM	4	S	1	F	6.3
73	W	TUNGSTEN	4	S	1	F	6.3
74	CO	COBALT	4	S	1	F	6.3
75	V	VANADIUM	4	S	1	F	6.3
76	BE	BERRYLLIUM	4	S	1	F	5.3
77	OH	HYDROXIDES	4	S	1	F	5.1
78	CH	CONDHYDCARD	4	S	1	F	7.3
79	PA	PALK	4	S	1	F	7.1
80	MA	MOALK	4	S	1	F	7.1
81	SCN	THIOCYANATE	4	S	1	F	6.2
82	TURB	TURBIDITY	4	S	1	F	7.1
83	FF	FLORIDE/FLD	4	S	1	F	7.1
84	TSSF	TSS/FLD	4	S	1	F	7.1
85	DMS	DMS	4	S	1	F	7.1

RP0808: NUMBER OF RECORDS IN TABLE=

85 LINES=

85

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Table 4.1-2

DESCRIPTION FOR RAMIS FILE SHAFTQW
12/01/81

LIST	FIELDNAME	SYNONYM	LEVEL	LEVEL TYPE	SEGMENT FACTOR	TYPE	LENGTH
1	LOCATION	LOC	1	S	1	A	4
2	YEAR	YR	2	S	1	I	2
3	MONTH	MO	2	S	1	I	2
4	DAY	DY	3	S	1	I	2
5	GROUT	GRT	3	S	1	I	2
6	PROBEHOLE	PBH	3	S	1	A	2
7	DEPTH	DP	3	S	1	I	5
8	ELEVATION	ELV	3	S	1	I	5
9	GPM	GPM	3	S	1	I	4
10	ALUMINUM	AL	3	S	1	F	6.3
11	ARSENIC	ARS	3	S	1	F	6.3
12	BARIUM	BA	3	S	1	F	6.2
13	BORON	B	3	S	1	F	6.2
14	CADMIUM	CD	3	S	1	F	6.3
15	CALCIUM	CA	3	S	1	F	6.1
16	CHROMIUM	CR	3	S	1	F	6.3
17	COBALT	CO	3	S	1	F	6.3
18	COPPER	CU	3	S	1	F	6.3
19	IRON	FE	3	S	1	F	6.2
20	LEAD	PB	3	S	1	F	6.3
21	LITHIUM	LI	3	S	1	F	6.2
22	MAGNESIUM	MG	3	S	1	F	6.1
23	MANGANESE	MN	3	S	1	F	6.3
24	MERCURY	HG	3	S	1	F	8.5
25	MOLYBDENUM	MOLY	3	S	1	F	6.3
26	NICKEL	NI	3	S	1	F	6.3
27	POTASSIUM	K	3	S	1	F	6.1
28	SELENIUM	SE	3	S	1	F	6.3
29	SILVER	AG	3	S	1	F	6.3
30	SODIUM	NA	3	S	1	F	7.1
31	STRONTIUM	SR	3	S	1	F	6.1
32	VANADIUM	V	3	S	1	F	6.3
33	ZINC	ZN	3	S	1	F	6.3
34	ALKALINITY	ALK	3	S	1	F	7.1
35	BICARBONATE	HCO3	3	S	1	F	7.1
36	CARBONATE	CO3	3	S	1	F	6.1
37	BROMIDE	BR	3	S	1	F	6.3
38	CHLORIDE	CL	3	S	1	F	7.1
39	FLUORIDE	F	3	S	1	F	6.2
40	HARDNESS	HARD	3	S	1	F	7.1
41	AMMONIA	NH3	3	S	1	F	6.3
42	KJELDNIT	KJN	3	S	1	F	6.1
43	NITRATE	NO3	3	S	1	F	6.2
44	BIOOXYDEMD	BOD	3	S	1	F	6.1
45	CHEMOXYDEM	COD	3	S	1	F	7.1
46	OILGREASE	OLGR	3	S	1	F	6.1
47	PHENOLS	PHEN	3	S	1	F	6.4
48	SILICA	SLC	3	S	1	F	6.1

Table 4.1-2 (continued)

DESCRIPTION FOR RAMIS FILE SHAFTQW
12/01/81

LIST	FIELDNAME	SYNONYM	LEVEL	LEVEL TYPE	SEGMENT FACTOR	TYPE	LENGTH
49	SOLIDSDISS	TDS	3	S	1	F	7.1
50	SUSSOLID	SUSS	3	S	1	F	7.1
51	SULFATE	SO4	3	S	1	F	6.1
52	TURBIDITY	TURB	3	S	1	F	7.1
53	DISSORGCARB	DOC	3	S	1	F	6.1
54	TOTALCOLIF	TCOLIF	3	S	1	F	6.1
55	FECALCOLIF	FCOLIF	3	S	1	F	6.1
56	PH	PH	3	S	1	F	5.2
57	SPECCOND	SPC	3	S	1	F	6.1
58	DISSOXY	DO	3	S	1	F	5.1
59	TEMP	TEMP	3	S	1	F	4.1
60	DUM1	DUM1	3	S	1	F	6.1
61	DUM2	DUM2	3	S	1	F	6.1
62	DUM3	DUM3	3	S	1	F	6.1
63	DUM4	DUM4	3	S	1	F	6.1

RP0808: NUMBER OF RECORDS IN TABLE=

63 LINES= 63

Table 4.1-3:

DESCRIPTION FOR RAMIS FILE WTRLEV
12/01/81

LIST	FIELDNAME	SYNONYM	LEVEL	LEVEL TYPE	SEGMENT FACTOR	TYPE	LENGTH
1	LOC	LOC	1	S	1	A	4
2	YR	YR	2	S	0	I	2
3	MO	MO	2	S	0	I	2
4	DY	DY	2	S	0	I	2
5	STATUS	ST	2	S	0	A	6
6	DEPTH	DP	2	S	0	F	9.4
7	TEMP	TEMP	2	S	0	F	5.1
8	PH	PH	2	S	0	F	4.1
9	DO	DO	2	S	0	F	5.1
10	SPC	SPC	2	S	0	F	6.1

RP0808: NUMBER OF RECORDS IN TABLE=

10 LINES= 10

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Table 4.1-4

DESCRIPTION FOR RAMIS FILE STEVEN
12/01/81

LIST	FIELDNAME	SYNONYM	LEVEL	LEVEL TYPE	SEGMENT FACTOR	TYPE	LENGTH
1	LOCATION	LOC	1	S	1	A	4
2	YEAR	YR	1	S	1	I	2
3	MONTH	MO	1	S	1	I	2
4	DAY	DY	2	S	1	I	2
5	DEPTH	DP	2	S	1	F	7.2

RP0808: NUMBER OF RECORDS IN TABLE=

5 LINES=

5

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Table 4.1-5

DESCRIPTION FOR RAMIS FILE NPDES
12/01/81

LIST	FIELDNAME	SYNONYM	LEVEL	LEVEL TYPE	SEGMENT FACTOR	TYPE	LENGTH
1	LOCATION	LOC	1	S	1	A	4
2	YEAR	YR	1	S	1	I	2
3	MONTH	MO	1	S	1	I	2
4	DAY	DY	1	S	1	I	2
5	FLOW	FLW	2	S	0	F	6.1
6	TOTSUSSLID	TSS	2	S	0	F	6.1
7	TOTDISSOLID	TDS	2	S	0	F	6.1
8	FLORIDE	F	2	S	0	F	6.2
9	BORON	B	2	S	0	F	6.2
10	AMMONIA	NH3	2	S	0	F	6.2
11	PHENOL	PHEN	2	S	0	F	6.3
12	ALUMINUM	AL	2	S	0	F	6.1
13	IRON	FE	2	S	0	F	6.2
14	OLGR	OLGR	2	S	0	I	5
15	PH	PH	2	S	0	F	5.2
16	CADMIUM	CD	2	S	0	F	6.2
17	COPPER	CU	2	S	0	F	6.2
18	MERCURY	HG	2	S	0	D	8.5
19	SILVER	AG	2	S	0	F	6.2
20	ZINC	ZN	2	S	0	F	6.2
21	SPC	SPC	2	S	0	F	7.1
22	DO	DO	2	S	0	F	5.2
23	TEMP	TEMP	2	S	0	F	5.1
24	FTOTSUSSLID	FTSS	2	S	0	F	5.1
25	COD	COD	2	S	0	F	7.3
26	FLORIDE/FLD	FF	2	S	0	F	7.1
27	DM3	DM3	2	S	0	F	7.1
28	DM4	DM4	2	S	0	F	7.1

RP0808: NUMBER OF RECORDS IN TABLE=

28 LINES= 28

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Table 4.1-6.

DESCRIPTION FOR RAMIS FILE NPDESSA
12/01/81

LIST	FIELDNAME	SYNONYM	LEVEL	LEVEL TYPE	SEGMENT FACTOR	TYPE	LENGTH
1	LOCATION	LOC	1	S	1	A	4
2	YEAR	YR	1	S	1	I	2
3	MONTH	MO	1	S	1	I	2
4	DAY	DY	1	S	1	I	2
5	TOTDISSOLID	TDS	2	S	1	F	6.1
6	FLORIDE	F	2	S	1	F	6.2
7	BORON	B	2	S	1	F	6.2
8	AMMONASN	NH3	2	S	1	F	6.3
9	PHENOL	PHEN	2	S	1	F	6.3
10	OILGREASE	OG	2	S	1	F	6.2
11	TMERCURY	THG	2	S	1	D	8.5
12	TALUMINUM	TAL	2	S	1	F	6.2
13	TARSENIC	TARS	2	S	1	F	6.2
14	TBARIUM	TBA	2	S	1	F	6.2
15	TCADMIUM	TCD	2	S	1	F	6.2
16	CALCIUM	CA	2	S	1	F	6.2
17	TCHROMIUM	TCR	2	S	1	F	6.2
18	TCOPPER	TCU	2	S	1	F	6.2
19	TIRON	TFE	2	S	1	F	6.2
20	TLEAD	TPB	2	S	1	F	6.2
21	TLITHIUM	TLI	2	S	1	F	6.2
22	MAGNESIUM	MG	2	S	1	F	6.2
23	TMANGANESE	TMN	2	S	1	F	6.2
24	TMOLYBDENUM	TMO	2	S	1	F	6.2
25	TNICKEL	TNI	2	S	1	F	6.2
26	TPOTASSIUM	TKA	2	S	1	F	6.2
27	SELENIUM	SE	2	S	1	D	8.4
28	TSILVER	TAG	2	S	1	F	6.2
29	TSODIUM	TNA	2	S	1	F	6.2
30	TSTRONTIUM	TSR	2	S	1	F	6.2
31	TZINC	TZN	2	S	1	F	6.2
32	TTITANIUM	TTI	2	S	1	F	6.2
33	TVANADIUM	TV	2	S	1	F	6.2
34	COD	COD	2	S	1	F	6.2
35	TOTALK	TALK	2	S	1	F	6.2
36	KJELDAHL	KJL	2	S	1	F	6.2
37	BICARBONATE	HC03	2	S	1	F	6.1
38	BROMIDE	BR	2	S	1	F	6.1
39	CARBONATE	C03	2	S	1	F	6.1
40	CHLORIDE	CL	2	S	1	F	6.1
41	NITRATE	N03	2	S	1	F	6.1
42	SULFATE	S04	2	S	1	F	6.1
43	SULFIDE	S03	2	S	1	F	6.1
44	SILICA	SI02	2	S	1	F	6.1
45	ALPHA	ALP	2	S	1	F	6.1
46	BETA	BET	2	S	1	F	6.1
47	RADIUM226	R226	2	S	1	F	6.3
48	URANIUM	U	2	S	1	D	8.4

Table 4.1-6 (continued)

DESCRIPTION FOR RAMIS FILE NPDESSA
12/01/81

LIST	FIELDNAME	SYNONYM	LEVEL	LEVEL TYPE	SEGMENT FACTOR	TYPE	LENGTH
49	TZIRCONIUM	TZR	2	S	1	F	6.3
50	TBERYLLIUM	TBE	2	S	1	F	6.3
51	TBISMUTH	TBI	2	S	1	F	6.3
52	TGERMANIUM	TGR	2	S	1	F	6.3
53	TGALLIUM	TGA	2	S	1	F	6.3
54	CYANIDE	CYAN	2	S	1	F	6.3
55	CONDUCTIVITY	COND	2	S	1	F	6.1
56	PH	PH	2	S	1	F	5.1
57	DOC	DOC	2	S	1	F	6.1
58	HPHOBICTOT	HPBT	2	S	1	F	6.1
59	HPHOBICBAS	HPBB	2	S	1	F	6.1
60	HPHOBICACD	HPBA	2	S	1	F	6.1
61	HPHOBICNTL	HPBN	2	S	1	F	6.1
62	HPHILICTOT	HPLT	2	S	1	F	6.1
63	HPHILICBAS	HPLB	2	S	1	F	6.1
64	HPHILICACD	HPLA	2	S	1	F	6.1
65	HPHILICNTL	HPLN	2	S	1	F	6.1
66	NTRANTRI	NN	2	S	1	F	6.3
67	TEMP	TEMP	2	S	1	F	6.2
68	SUSSOLD	SUSS	2	S	1	F	6.2
69	TCS	TCESIUM137	2	S	1	F	6.2
70	SR90	SR90	2	S	1	F	6.2
71	DO	DO	2	S	1	F	6.2
72	NITRITE	NO3	2	S	1	F	6.2
73	TOC	TOC	2	S	1	F	6.2
74	FLORIDE/FLD	FF	2	S	1	F	6.2
75	TSS/FLD	TSSF	2	S	1	F	6.2
76	DUMMY1	DM1	2	S	1	F	6.2
77	DUMMY2	DM2	2	S	1	F	6.2
78	DUMMY3	DM3	2	S	1	F	6.2

RP0808: NUMBER OF RECORDS IN TABLE=

78 LINES=

78

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Table 4.1-7

DESCRIPTION FOR RAMIS FILE INJECT
12/01/81

LIST	FIELDNAME	SYNONYM	LEVEL	LEVEL TYPE	SEGMENT FACTOR	TYPE	LENGTH
1	CODE	CODE	1	S	1	A	4
2	YR	YR	2	S	0	I	2
3	MO	MO	2	S	0	I	2
4	DY	DY	2	S	0	I	2
5	HR	HR	2	S	0	I	2
6	MIN	MIN	2	S	0	I	2
7	MARK	MARK	2	S	0	I	5
8	DEPTH	DEPTH	2	S	0	F	6.2

RP0808: NUMBER OF RECORDS IN TABLE= 8 LINES= 8

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Table 4.1-8.

DESCRIPTION FOR RAMIS FILE WTRUSAGE
12/01/81

<u>LIST</u>	<u>FIELDNAME</u>	<u>SYNONYM</u>	<u>LEVEL</u>	<u>LEVEL TYPE</u>	<u>SEGMENT FACTOR</u>	<u>TYPE</u>	<u>LENGTH</u>
1	SHAFT	SH	1	S	1	A	3
2	YEAR	YR	2	S	1	I	2
3	MONTH	MO	2	S	1	I	2
4	DAY	DY	2	S	1	I	2
5	FLOW	FL	2	S	1	F	6.1

RP0808: NUMBER OF RECORDS IN TABLE= 5 LINES= 5

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Table 4.1-9

DESCRIPTION FOR RAMIS FILE LTLAIR
12/01/81

LIST	FIELDNAME	SYNONYM	L E V E L		SEGMENT	FORMAT	
			NAME	TYPE	FACTOR		
1	TRAILER	TRL	1	S	2	A	3
2	YEAR	YR	2	S	0	A	2
3	MONTH	MO	2	S	0	A	2
4	DAY	DY	3	S	31	A	2
5	HOUR	HR	3	S	31	A	2
6	NITROGOX	NOX	3	S	31	F	6.1
7	NITRICOX	NO	3	S	31	F	6.1
8	SULFDIOX	SO2	3	S	31	F	6.1
9	WINDSP30	WS	3	S	31	F	6.1
10	WINDDIR30	WD	3	S	31	F	6.1
11	RELATHUMID	RH	3	S	31	F	6.1
12	TEMINTRL	TIN	3	S	31	F	6.1
13	TEMOUT30	TOUT	3	S	31	F	6.1
14	SOLRAD	SR	3	S	31	F	6.1
15	HYDROGSULF	H2S	3	S	31	F	6.1
16	LINEVOLT	VOLT	3	S	31	F	6.1
17	TOTHYDCARB	THC	3	S	31	F	6.1
18	METHANE	CH4	3	S	31	F	6.1
19	CARBMONOX	CO	3	S	31	F	6.1
20	OZONE	O3	3	S	31	F	6.1
21	BARPRESS	PRES	3	S	31	F	6.1
22	WINDSTDDEV	WSD	3	S	31	F	6.1
23	RAINFALL	RAIN	3	S	31	F	6.1
24	NITROGDIOX	NO2	3	S	31	F	6.1
25	NONMETHHC	NMHC	3	S	31	F	6.1

_ RP0808: NUMBER OF RECORDS IN TABLE= 25 LINES= 25

Table 4.1-10

DESCRIPTION FOR RAMIS FILE PARTIC
12/01/81

LIST	FIELDNAME	SYNONYM	LEVEL	LEVEL TYPE	SEGMENT FACTOR	TYPE	LENGTH
1	TRAILER	TRL	1	S	4	A	4
2	YEAR	YR	2	S	0	I	2
3	MONTH	MO	2	S	0	I	2
4	DAY	DY	3	S	31	I	2
5	PARTICULATE	PART	3	S	31	F	6.1

RP0008: NUMBER OF RECORDS IN TABLE= 5 LINES= 5

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Table 4.1-11

DESCRIPTION FOR RAMIS FILE VRANGE
12/01/81

LIST	FIELDNAME	SYNONYM	LEVEL	LEVEL TYPE	SEGMENT FACTOR	TYPE	LENGTH
1	TRAILER	TRL	1	S	1	A	4
2	YEAR	YR	2	S	0	I	2
3	MONTH	MO	2	S	0	I	2
4	DAY	DY	3	S	0	I	2
5	RANGE	RNG	3	S	0	F	6.1

RP0808: NUMBER OF RECORDS IN TABLE=

5 LINES=

5

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Table 4.1-12

DESCRIPTION FOR RAMIS FILE MRIDATA
12/01/81

LIST	FIELDNAME	SYNONYM	LEVEL	LEVEL TYPE	SEGMENT FACTOR	TYPE	LENGTH
1	STATION	ST	1	S	4	A	4
2	YEAR	YR	2	S	0	A	2
3	MONTH	MO	2	S	0	A	2
4	DAY	DY	3	S	31	A	2
5	HOUR	HR	3	S	31	A	2
6	WINDSPEED	WS	3	S	31	F	6.1
7	WINDDIR	WD	3	S	31	F	6.1
8	TEMPERATURE	TEMP	3	S	31	F	6.1

RP0808: NUMBER OF RECORDS IN TABLE=

8 LINES=

8

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Table 4.1-13

DESCRIPTION FOR RAMIS FILE METAIR
12/01/81

LIST	FIELDNAME	SYNONYM	L E V E L		SEGMENT	FORMAT	
			NAME	TYPE	FACTOR		
1	TOWER	TOW	1	S	1	A	3
2	YEAR	YR	2	S	0	A	2
3	MONTH	MO	2	S	0	A	2
4	DAY	DY	3	S	31	A	2
5	HOUR	HR	3	S	31	A	2
6	WINDSP8	WS1	3	S	31	F	6.1
7	WINDDIR8	WD1	3	S	31	F	6.1
8	RELHUM8	RH1	3	S	31	F	6.1
9	TEMP8	TMP1	3	S	31	F	6.1
10	WINDSP30	WS2	3	S	31	F	6.1
11	WINDDIR30	WD2	3	S	31	F	6.1
12	RELHUM30	RH2	3	S	31	F	6.1
13	TEMP30	TMP2	3	S	31	F	6.1
14	WINDSP100	WS3	3	S	31	F	6.1
15	WINDDIR100	WD3	3	S	31	F	6.1
16	RELHUM100	RH3	3	S	31	F	6.1
17	TEMP100	TMP3	3	S	31	F	6.1
18	WINDSP200	WS4	3	S	31	F	6.1
19	WINDDIR200	WD4	3	S	31	F	6.1
20	RELHUM200	RH4	3	S	31	F	6.1
21	TEMP200	TMP4	3	S	31	F	6.1
22	DELTTEMP1	DT1	3	S	31	F	6.1
23	DELTTEMP2	DT2	3	S	31	F	6.1
24	BIWVS30	BWS1	3	S	31	F	6.1
25	HORWD30	HWD1	3	S	31	F	6.1
26	VERTWD30	VWD1	3	S	31	F	6.1
27	BIWVS100	BWS2	3	S	31	F	6.1
28	HORWD100	HWD2	3	S	31	F	6.1
29	VERTWD100	VWD2	3	S	31	F	6.1
30	BIWVS200	BWS3	3	S	31	F	6.1
31	HORWD200	HWD3	3	S	31	F	6.1
32	VERTWD200	VWD3	3	S	31	F	6.1
33	WINDSD8	WDV1	3	S	31	F	6.1
34	WINDSD30	WDV2	3	S	31	F	6.1
35	WINDSD100	WDV3	3	S	31	F	6.1
36	WINDSD200	WDV4	3	S	31	F	6.1
37	HWINDSD30	HSD1	3	S	31	F	6.1
38	VWINDSD30	VSD1	3	S	31	F	6.1
39	HWINDSD100	HSD2	3	S	31	F	6.1
40	VWINDSD100	VSD2	3	S	31	F	6.1
41	HWINDSD200	HSD3	3	S	31	F	6.1
42	VWINDSD200	VSD3	3	S	31	F	6.1

RP0808: NUMBER OF RECORDS IN TABLE=

42 LINES=

42

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Table 4.1-14

DESCRIPTION FOR RAMIS FILE EVAPORATION
12/01/81

LIST	FIELDNAME	SYNONYM	LEVEL	LEVEL TYPE	SEGMENT FACTOR	TYPE	LENGTH
1	TRL	TRAILER	1	S	1	A	4
2	YR	YEAR	1	S	1	I	2
3	MO	MONTH	1	S	1	I	2
4	DY	DAY	1	S	1	I	2
5	EVPAV	EVPAVER	1	S	1	F	7.3
6	EVPTOT	EVPTOTAL	1	S	1	F	7.3
7	WAV	WINDAVER	1	S	1	F	6.1
8	WTOT	WINDTOTAL	1	S	1	F	6.1

RP0808: NUMBER OF RECORDS IN TABLE=

8 LINES=

8

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Table 4.1-15

DESCRIPTION FOR RAMIS FILE ACRADAR
12/01/81

LIST	FIELDNAME	SYNONYM	L E V E L		SEGMENT	FORMAT	
			NAME	TYPE	FACTOR		
1	TRAILER	TRL	1	S	1	A	4
2	YEAR	YR	2	S	0	A	2
3	MONTH	MO	2	S	0	A	2
4	DAY	DY	3	S	31	A	2
5	HOUR	HR	3	S	31	A	2
6	MIXHGT	MIX	3	S	31	F	6.1
7	STBCLS1	STB1	3	S	31	F	6.1
8	INVERHGT	INV	3	S	31	F	6.1
9	STBCLS2	STB2	3	S	31	F	6.1

RP0808: NUMBER OF RECORDS IN TABLE= 9 LINES= 9

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Table 4.1-16

DESCRIPTION FOR RAMIS FILE MICRO

12/01/81

LIST	FIELDNAME	SYNONYM	LEVEL	LEVEL TYPE	SEGMENT FACTOR	TYPE	LENGTH
1	STATION	ST	1	S	2	A	4
2	YEAR	YR	2	S	0	I	2
3	MONTH	MO	3	S	0	I	2
4	DAY	DY	4	S	0	I	2
5	STATID	SID	5	S	0	A	2
6	TEMPMX1M	TPMX	5	S	0	F	5.1
7	TEMPMN1M	TPMN	5	S	0	F	5.1
8	SRFTPMAX	STPMX	5	S	0	F	5.1
9	SRFTPMIN	STPMN	5	S	0	F	5.1
10	PRECIP	PR	5	S	0	F	6.2
11	SNODPTH	SD	5	S	0	F	5.1
12	SNOMOIST	SM	5	S	0	F	5.1

RP0808: NUMBER OF RECORDS IN TABLE=

12 LINES=

12

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Table 4.1-17

DESCRIPTION FOR RAMIS FILE DRKILL
12/01/81

<u>LIST</u>	<u>FIELDNAME</u>	<u>SYNONYM</u>	<u>L E V E L</u> <u>NAME TYPE</u>	<u>SEGMENT</u> <u>FACTOR</u>	<u>FORMAT</u>
1	MILE	ML	1 S	42	A 4
2	YEAR	YR	2 S	10	I 2
3	MONTH	MO	3 S	12	I 2
4	DAY	DY	4 S	31	I 2
5	STRESS	STR	5 S	1	A 5
6	COUNT	CNT	5 S	1	I 4
7	SEX	SX	6 S	1	A 2
8	AGE	AG	6 S	1	A 10
9	WEATHER	WTHR	7 U	1	A 20

RP0808: NUMBER OF RECORDS IN TABLE=

9 LINES=

9

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Table 4.1-18

DESCRIPTION FOR RAMIS FILE DEERCNT
12/01/81

LIST	FIELDNAME	SYNONYM	L E V E L		SEGMENT FACTOR	FORMAT	
			NAME	TYPE			
1	MILE	ML	1	S	1	A	4
2	YEAR	YR	2	S	1	I	2
3	MONTH	MO	2	S	1	I	2
4	DAY	DY	2	S	1	I	2
5	WEATHER	WTHR	2	S	1	A	20
6	COUNT	CNT	2	S	1	I	4

RP0808: NUMBER OF RECORDS IN TABLE= 6 LINES= 6

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Table 4.1-19

DESCRIPTION FOR RAMIS FILE BIRDS
12/01/81

LIST	FIELDNAME	SYNONYM	L E V E L		SEGMENT	FORMAT	
			NAME	TYPE	FACTOR		
1	TRANSECT	TRAN	1	S	1	I	2
2	YEAR	YR	2	S	1	I	2
3	GROUPNO	GN	2	S	1	I	2
4	SPEICES	SP	2	S	1	A	6
5	COUNT	CNT	2	S	1	I	4

RP0808: NUMBER OF RECORDS IN TABLE= 5 LINES= 5

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Table 4.1-20

DESCRIPTION FOR RAMIS FILE TRAF
12/01/81

LIST	FIELDNAME	SYNONYM	L E V E L		SEGMENT	FORMAT	
			NAME	TYPE	FACTOR		
1	LOCATION	LOC	1	S	1	A	4
2	YEAR	YR	2	S	1	I	2
3	MONTH	MO	2	S	1	I	2
4	DAY	DY	2	S	1	I	2
5	HOUR	HR	2	S	1	I	2
6	INTRAF	IT	2	S	1	I	5
7	OUTRAF	OT	2	S	1	I	5

RP0808: NUMBER OF RECORDS IN TABLE= 7 LINES= 7

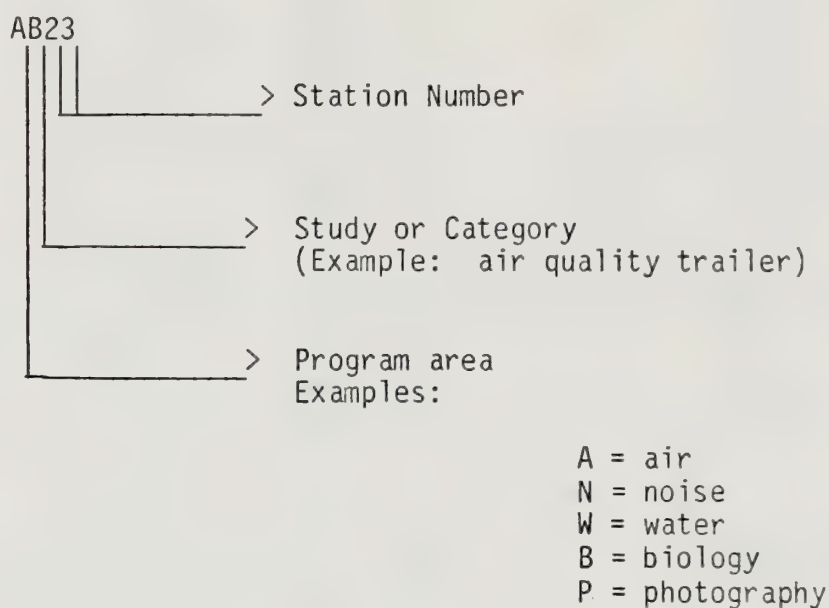
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4.2 Station Computer Code

Four-digit computer codes have been designated for monitoring stations to be used with a computerized data base management system (RAMIS). A major portion of the raw data collected at the C-b Tract is retained in RAMIS. Once entered the data can be retrieved for reporting and/or statistical analysis. The codes reduce storage space and provide a systematic identification to access station data sets. The code consists of two letters followed by two numbers.



The codes are presented in Table 4.2-1 for the environmental program along with the current station designations. An attempt has been made throughout this report to refer to all stations in terms of their four-digit codes.

Table 4.2-1
COMPUTER CODE AND STATION I.D. CROSS-REFERENCE

I Air Quality & Meteorology

	<u>Station Designation</u>	<u>Computer Code</u>
Met. Tower:	@ Sta. 023	AA23
Trailers:	020	AB20
	021	AB21
	022	AB22
	023	AB23
	024	AB24
Acoustic Radar	Sta. 020	AC20
	021	AC21
	023	AC23
MRI and Particulates	Sta. 031	AD31
	032	AD32
	033	AD33
	041	AD41
	042	AD42
	043	AD43
	044	AD44
	056	AD56
Visibility	View I	AV01
	View II	AV02
	View III	AV03
	View IV	AV04

II Biology

<u>Program</u>	<u>General Location</u>	<u>Computer Code</u>	<u>*Analysis Code</u>
Deer Days Use	Between Hunter Cr. & Jimmy Gulch	BA01	- PJ-CH-C
		BA02	- PJ-CH-C
		BA03	- PJ-CH-C
		BA04	- PJ-CH-C
		BA05	- PJ-CH-C
		BA06	- PJ-CH-C
		BA07	- PJ-CH-C
		BA08	- PJ-CH-C
		BA09	- PJ-CH-C
	North Side, Piceance Creek	BA10	- PJ -D
		BA11	- PJ -D
		BA12	- PJ -D
		BA13	- PJ -C
		BA14	- PJ -C
	South Side, Piceance Creek	BA15	- PJ -C
		BA16	- PJ -D

Biology (Cont'd)

<u>Program</u>	<u>General Location</u>	<u>Computer Code</u>	<u>*Analysis Code</u>
	On Tract Between Cottonwood & Scandard	BA17	- PJ-CH-C
		BA18	- PJ-CH-C
		BA19	- PJ -C
	On Tract Between Cottonwood & Sorghum	BA20	- PJ-CH-D
		BA21	- PJ-CH-D
		BA22	- PJ -D
	On Tract Between Sorghum & W. Fork Stewart	BA23	- PJ-CH-D
		BA24	- PJ
		BA25	- PJ-CH-C
	On Tract Between W. & M. Fork Stewart	BA26	- PJ -C
		BA27	- PJ -C
	On Tract Between Willow & Scandard North End	BA28	- PJ-CH-C
	On Tract Between Willow & Scandard S.E.	BA29	- PJ-CH-C
	On Tract Between Cottonwood & Sorghum North	BA30	- PJ-CH-C
	On Tract Between Cottonwood & Sorghum South	BA31	- PJ-CH-C

*ANALYSIS CODES:

PJ-CH-C	-	Pinyon Juniper, Chained, Control Station	(12)
PJ -C	-	Pinyon Juniper, Control Station	(6)
PJ-CH-D	-	Pinyon Juniper, Chained, Development Station	(3)
PJ -D	-	Pinyon Juniper, Development Station	(6)

Biology (Cont'd)

Programs: Deer Distribution & Migration and Road Kills

Mile Marker	Location	Computer Code	
		North & East of Piceance Creek Road	Meadows; South & West of Piceance Creek Road
41	White River City	BN41	BM41
40	Piceance Bridge	BN40	BM40
39	Lower Canyon	BN39	BM39
38	Piceance Canyon	BN38	BM38
37	Yellow Creek	BN37	BM37
36	Stinking Springs	BN36	BM36
35	Old Bridge	BN35	BM35
34	Little Hills Turnoff	BN34	BM34
33	Old Corrals & Buildings	BN33	BM33
32	Burk Ranch	BN32	BM32
31	Ranch	BN31	BM31
30		BN30	BM30
29		BN29	BM29
28	Bureau of Mines	BN28	BM28
27	Ryan Gulch	BN27	BM27
26	Pump Station	BN26	BM26
25		BN25	BM25
24	Rock School	BN24	BM24
23	AQ 021	BN23	BM23
22	Pat Johnson's Ranch	BN22	BM22
21	Hunter Creek	BN21	BM21
20	PL Gate	BN20	BM20
19	AQ 020	BN19	BM19
18	Sorghum, Cottonwood	BN18	BM18
17	Stewart Gulch Rd.	BN17	BM17
16	AQ Trailer 022	BN16	BM16
15	Oldland's Ranch	BN15	BM15
14	Oldland's Ranch	BN14	BM14
13	Pond and Cabin	BN13	BM13
12	Sprague Gulch	BN12	BM12
11	Cascade Gulch	BN11	BM11
10	13 Mile Gulch	BN10	BM10
9	14 Mile Gulch	BN09	BM09
8	Schutte Gulch	BN08	BM08
7	Robinson's Ranch	BN07	BM07
6		BN06	BM06
5	2 Old Cabins (35 MPH Curve)	BN05	BM05
4	McCarthy Gulch	BN04	BM04
3	Cow Creek	BN03	BM03
2	Mahogany Outcropping	BN02	BM02
1	Woodward Ranch	BN01	BM01
0	Rio Blanco Store	BN00	BM00

Biology (Cont'd)

<u>Programs</u>	<u>General Location</u>	<u>Computer Code</u>
Deer Mortality	North Side of Piceance Creek	BD01 BD02 BD03 BD04 BD05 BD06
	South Side of Piceance Creek	BD07 BD08 BD09 BD10
Deer Age Class	General Area of Tract	BE01
Coyotte Abundance	8 Transects for Total for 30 miles 15 mi seg. near Hunter (Control) 15 mi seg. on & South of Tract (Development)	BF01 BF02 thru BF08
Lagomorph Abundance	Identical Locations to deer use days	BA01 to BA31
Small Mammals	Piceance Creek (Development) On-Tract-west Piceance Creek (Control) On-Tract-east Sprinkler Area Section B Sprinkler Area (Control) Sprinkler Area (Development) Sprinkler Area (Control)	BG01 BG02 BG03 BG04 BG05 BG11 BG22 BG33
Avifauna		
Songbirds and Gamebirds	N.W. of Tract-near Jimmy PJ-CH-C On-Tract-Scandard PJ- -D On-Tract-Cottonwood PJ-CH-D S. of Tract-Between W&N Fork Stewart PJ- C Sprinkler	BH01 BH02 BH03 BH04 BH05
Raptors	The entire Tract and surrounding study areas.	BI01
Aquatic Ecology		
Benthos	USGS 09306007 (Control) USGS 09306058 (Development) USGS 09306061 (Development)	WU07 WU58 WU61
Periphyton	Piceance Creek Upstream (Control) Piceance Creek Downstream (Development)	WP01 WP02 WP03

Biology (Cont'd)

<u>Programs</u>	<u>General Location</u>	<u>Computer Code</u>		
Water Quality	USGS 09306061 (Development)	WU61		
Vegetation				
Community Structure	Plots	*	**	***
	Chained pinyon juniper (1978)(Dev)	BJ01	BJ11	BJ21
	Chained pinyon juniper (1978)(Cont)	BJ02	BJ12	BJ22
	Upland sagebrush (1980)(Cont)	BJ03	BJ13	BJ23
	Bottomland sagebrush (1980)(Cont)	BJ04	BJ14	BJ24
	Pinyon juniper woodland (1979)(Dev)	BJ05	BJ15	BJ25
	Pinyon juniper woodland (1979)(Cont)	BJ06	BJ16	BJ26
Herb Productivity and Utilization	Identical locations to community structure	BJ01 thru BJ26		
	<u>Plus</u>			
	60 range cages in random locations	BK01 thru BK60		
	10 cages on S. facing PJ for baseline	BK61 thru BK70		
	20 cages for fertilization assessment	BK71 thru BK90		
Shrub Productivity and Utilization	Same stations as Deer Days Use Study	BA01 thru BA31		
General Condition	By aircraft over entire Tract area	Not in computer		

- * Fenced (8')
- ** Open
- *** Fenced (4')

Biology (Cont'd)

<u>Program</u>	<u>General Location</u>	<u>Computer Code</u>
Micro Climate	MC Sta. 1	BC01
	2	BC02
	3	BC03
	4	BC04
	5	BC05
	6	BC06
	7	BC07
	8	BC08
	9	BC09
	13	BC13
Traffic Count	Rio Blanco Store	BT01
	South of Cattle Guard	BT02
	Rio Blanco Lake	BT03

III Noise

	<u>Station Designation</u>	<u>Computer Code</u>
Traffic Noise	Sta. IX	NB01
	XV	NB15

IV Photography

P1	PA01
P2	PA02
P3	PA03
P4	PA04
P5	PA05
P6	PA06
P7	PA07
P8	PA08
P9	PA09
P10	PA10
P11	PA11
P12	PA12
P13	PA13
P14	PA14
P15	PA15
P16	PA16
P17	PA17
P18	PA18
P19	PA19
P20	PA20
P21	PA21
P22	PA22
P23	PA23
P24	PA24
P25	PA25

Photography

General Location

Computer Code

P26
P27
P28
P29
P30
P31
P32
P33
P34
P35

PA26
PA27
PA28
PA29
PA30
PA31
PA32
PA33
PA34
PA35

V. Water (cont'd)
Upper Aquifer Wells

Before Recompletions			Recompletion #1			Recompletion #2		
Station	Code	Elevation	Station	Code	Date	Station	Code	Date
CB-2	WX02	6737.0	CB-2	WD02	11-18-80			
CB-4	WX04	7057.3	CB-4	WE04	11-20-80			
SG-10A	WX10	6953.6	SG-10A-1	WE10	*	SG-10A-1	WG51	
			SG-10A-2	WD10	*	SG-10A-2	WE51	*
						SG-10A-Annulus	WD51	
SG-1A	WX11	6425.0	SG-1A-1	WE11	12-12-80			
			SG-1A-2	WD11	12-12-80			
SG-1-2	WX12	6428.6	SG-1-2	WD12	11-01-80			
14X-7	WX14	6909.0	14X-7-1	WD14	11-15-80			
			14X-7-2	WD15	11-15-80			
SG-17-2	WX17	7038.6				SG-17-2	WE17	11-03-80
						SG-17-3	WD17	11-03-80
						SG-17-4	WC17	11-03-80
SG-18A	WX18	7386.6	SG-18A-1	WG18	12-02-80			
			SG-18A-2	WE18	12-01-80			
			SG-18A-3	WD18	12-02-80			
SG-19	WX19	6384.4	SG-19	WD19				
SG-20	WX20	6358.0	SG-20-1	WG20	11-15-80			
			SG-20-2	WE20	11-15-80			
			SG-20-3	WD20	11-15-80			
SG-21	WX21	6813.3	SG-21-1	WH21	12-08-80			
			SG-21-2	WG21	12-08-80			
			SG-21-3	WE21	12-08-80			
			SG-21-4	WD21	12-09-80			
AT-1C-3	WX44	6906.0						
SG-11-3	WX55	6903.1				SG-11-3	WD52	10-18-80
SG-6-3	WX63	6890.7	SG-6-3	WD61	10-20-80			
SG-8-2	WX82	0000.0						
SG-9-2	WX92	6873.0	SG-9-2	WE91	12-11-80			
			SG-9-3	WD91	12-11-80			
			SG-9-4	WC91	12-12-80			
32X-12	WX32	6830.3						
33X-1	WX33	6707.1						
41X-1	WX41	6460.0						
TH75-5A	WX64	7178.0						
TH75-13A	WX65	6390.0						
TH75-18A	WX67	6740.0						
TH75-9A	WX69	7350.0						
CER RB-D-02	WX71	6580.0						
TH75-15A	WX72	6805.0						
UNION 8-1	WX73	8142.3						
COLONY 12-596	WX74	0000.0						
TH-5	WX75	7583.2						

* Recompletion #1 not satisfactory for these strings: use #2.

V. Water (cont'd)
Lower Aquifer Wells

After Completion			Recompletion #1			Recompletion #2		
Station	Code	Elevation	Station	Code	Date	Station	Code	Date
CB-1	WY01	6763.4	CB-1	WD01	11-14-80			
CB-3	WY03	6743.1	CB-3	WE03	11-18-80			
SG-10	WY09	6952.5	SG-10R	WG10		SG-10	WD90	
SG-1-1	WY12	6428.8	SG-1-1	WG12	11-1-80			
SG-17-1	WY18	7038.6	SG-17-1R	WY17		SG-17-1	WG17	11-03-80
AT-1C-1	WY45	6906.0						
AT-1C-2	WY46	6906.0						
SG-11-1	WY51	6903.1	SG-11-1R	WY52		SG-11-1	WG52	10-18-80
SG-11-2	WY54	6903.1				SG-11-2	WE52	10-18-80
SG-6-1	WY61	6890.7	SG-6-1	WE61	10-20-80			
SG-6-2	WY62	6890.7	SG-6-2	WG61	10-20-80			
SG-8	WY80	6540.8	SG-8R	WY81				
SG-9-1	WY91	6873.0	SG-9-1	WG91	12-11-80			
AT-1	WY44	6909.0						
TH75-5B	WY64	7178.0						
TH75-13B	WY65	6390.0						
EQUITY-1	WY66	6286.0						
TH75-10B	WY68	6840.0						
TH75-9B	WY69	7350.0						
EQUITY-SULFUR-1A	WY70	7070.0						
CER RB-D-03	WY71	6580.0						
TH75-15B	WY72	6805.0						
TG71-3	WY75	6820.0						
TG71-5	WY76	6865.0						
GETTY 9-40	WY77	7777.8						
TG71-4	WY78	7145.0						
EQUITY BS-13	WY79	7020.0						

New Wells

Station	Code	Date	Elevation
SG-17A	WD57	12-02-80	7036.0
AT-1D-1	WG41	11-16-80	6909.0
AT-1D-2	Abandoned		
AT-1D-3	WD41	11-16-80	6909.0
AT-1A	WV37		6909.0
AT-1A1	WX38		6909.0
AT-1B	WV40		6909.0

V. Water (cont'd)

Before Recompilations
Station Code Elevation

Recompletion #1
Station Code Date

Composite Wells:

GREENO 404	WV01	6411.0
OLDLAND 3	WV02	6490.0
GP-17X-BG	WV03	
BUTE 25	WV04	
LIBERTY BELL 12	WV05	7420.0
TOSCO WELL	WV06	

Seepage Monitoring Wells:

32Y-12	WW32	
31X-12	WW12	6764.0
41X-13-2	WW13	6953.6

Reinjection Wells:

22X-17	WI19	
11X-18	WI18	6950.0
24X-17	WI17	

Ponds:

POND A	WN01
POND B	WN02
POND C	WN03
POND A SPRINGS	WN11
POND B SPRINGS	WN12
POND C SPRINGS	WN13
POND A INLET	WN21
POND B INLET	WN22
POND C INLET	WN23
POND A-B CROSSOVER	WN31
POND B OUTLET	WN32
POND C OUTLET	WN33
BACKWASH POND	WN04
BACKWASH POND SPRINGS	WN14
BACKWASH POND INLET	WN24
BACKWASH POND OUTLET	WN34
POND A-B DISCHARGE	WN40

Shafts:

V/E SHAFT PROBE HOLES	WZ01
SERVICE SHAFT PROBE HOLES	WZ02
PRODUCTION SHAFT PROBE HOLES	WZ03
V/E SHAFT WATER RING	WZ11
SERVICE SHAFT WATER RING	WZ12
PRODUCTION SHAFT WATER RING	WZ13
V/E SHAFT SUMP	WZ21
SERVICE SHAFT SUMP	WZ22
PRODUCTION SHAFT SUMP	WZ23
V/E SHAFT	WZ31
PRODUCTION SHAFT	WZ33
SHAFT GROUT HOLE	WZ41

V. Water (cont'd)

Before Recompletions
Station Code Elevation

Recompletion #1
Station Code Date

Discharge Monitoring
Stations

NO NAME GULCH	WU42
UPPER PICEANCE CREEK	WN41
LOWER PICEANCE CREEK	WN42
HUNTER CREEK	WU02
WILLOW CREEK	WU01

Mobil Wells

WELL NO. 1	MW01	6510
WELL NO. 2	MW03	6480
WELL NO. 3	MW03	6618
WELL NO. 12	MW12	6486
WELL NO. 13	MW13	6509

V. Water

<u>Program</u>	<u>Station Designation</u>	<u>Computer Code</u>	<u>Elevation</u>
U.S.G.S. Stream Gauging Station	09304800	WU48	
	09306007	WU07	
	09306036	WU36	
	09306039	WU39	
	09306042	WU42	
	09306061	WU61	
	09306050	WU50	
	09306052	WU52	
	09306058	WU58	
	09306033	WU33	
	09306025	WU25	
	09306015	WU15	
	09306028	WU28	
	09306022	WU22	
	09306200	WU00	
	09306222	WU62	
	09306255	WU55	
Alluvial Wells	A-1	WA01	6282.2
	A-2	WA02	6284.5
	A-3	WA03	6448.6
	A-4	WA04	0000.0
	A-5	WA05	6345.0
	A-5A	WA55	6460.0
	A-5B	WA56	0000.0
	A-6	WA06	6360.0
	A-7	WA07	6383.8
	A-8	WA08	6409.0
	A-9	WA09	6540.2
	A-10	WA10	6610.6
	A-11	WA11	6503.8
Springs and Seeps	A-12	WA12	6691.8
	A-13	WA13	0000.0
	CB S-1	WS01	
	CB S-2	WS02	
	CB S-3	WS03	
	CB S-4	WS04	
	CB S-6	WS06	
	CB S-6A	WS66	
	CB S-7	WS07	
	CB S-8	WS08	
	CB S-9	WS09	
	CB S-10 (W-3)	WS10 (WS34)	
	CB Seep A	WS11	
	S-102	WS12	
	CER-1	WS21	
	B-3	WS22	
	H-3	WS23	
	F-3	WS24	

V. Water

<u>Program</u>	<u>Station Designation</u>	<u>Computer Code</u>	<u>Elevation</u>
Springs and Seeps (cont)	Figure 4-A	WS25	
	W-4	WS26	
	W-9	WS27	
	CER-7	WS28	
	S-9	WS29	
	P3 & P3A	WS30	
	CER-6	WS31	
	W-2 (S-9)	WS32	
	S-2	WW33	
	W-3 (CB S-10)	WS34 (WS10)	
	Figure 4	WS35	
	S-11 (S-101)	WS36	
	Oldland Spring	WS37	
Precipitation	CB-020	AB20	
	CB-023	AB23	
	LH	WR01	
	M	WR02	
	SG	WR03	
	CG	WR04	
	JQS	WR05	
	EFPC	WR06	
	EMFPC	WR07	
	UCBW	WR08	

4.3 Station Coordinates

Environmental monitoring stations have been specified by station computer code, latitude and longitude, township and range, Colorado State coordinates and elevations for this report period. In cases where stations represent biological transects several meters in length, the coordinates reported are those of a point on the map near the station label. A jacket map of the Tract area (Figure 4.3-1) showing all monitoring stations on and near Tract C-b, required by the Developmental Monitoring Program, and a jacket map (Vol. I, Figure 2.2-1) of off tract monitoring stations, required by Water Augmentation Plan, are designated by their four-digit computer station codes.

ENVIRONMENTAL DATA COLLECTION STATION COORDINATES

STATION CODE	LATITUDE & LONGITUDE	TOWNSHIP & RANGE	STATE COORDINATES*	ELEVATION
<u>I. AIR QUALITY AND METEOROLOGY</u>				
AA23	39° 47' 43" 108° 12' 57"	T3S R96W Sec 18 NW1/4, NW1/4, NW1/4	N 180,000 E 1,237,045	6950'
AB20	39° 50' 10" 108° 13' 08"	T2S R97W Sec 36 NE1/4, SE1/4, NE1/4	N 194,845 E 1,236,605	6280'
AB23	39° 47' 44" 108° 12' 54"	T3S R96W Sec 18 NE1/4, NW1/4, NW1/4	N 180,000 E 1,237,234	6950'
AB24 *	39° 48' 49" 108° 12' 21"	T3S R96W Sec 6 NE1/4, SW1/4, SE1/4	N 186,542 E 1,240,000	6750'
AB26			N 166,900 E 1,235,200	
AC20	39° 50' 08" 108° 13' 06"	T2S R97W Sec 36 NE1/4, SE1/4, NE1/4	N 194,594 E 1,236,794	6310'
AD42	39° 48' 58" 108° 13' 08"	T3S R97W Sec 1 SE1/4, NE1/4, SE1/4	N 187,548 E 1,236,417	6720'
AD56* *	39° 49' 31" 108° 12' 23"*	T3S R96W Sec 6 NE1/4, NW1/4, NE1/4	N 190,760 E 1,240,005	6380'
<u>II. BIOLOGY</u>				
*BA01 *	39° 50' 15"* 108° 16' 12"*	T2S R97W Sec 34 SW1/4, NE1/4, NW1/4	N 195,788 E 1,222,268	6480'
*BA02 *	39° 50' 3"* 108° 16' 4"*	T2S R97W Sec 34 SE1/4, SW1/4, NW1/4	N 194,594 E 1,222,079	6500'
BA03	39° 49' 32" 108° 16' 5"	T3S R97W Sec 3 NE1/4, NE1/4, NW1/4	N 191,388 E 1,222,708	6640'
BA04	39° 49' 12" 108° 15' 46"	T3S R97W Sec 3 NE1/4, NW1/4, SE1/4	N 189,371 E 1,224,091	6600'
BA05	39° 48' 39" 108° 16' 14"	T3S R97W Sec 3 SW1/4, SE1/4, SW1/4	N 186,039 E 1,221,828	6720'
BA06	39° 48' 19" 108° 16' 19"	T3S R97W Sec 10 SE1/4, SW1/4, NW1/4	N 184,028 E 1,221,388	6780'
BA07	39° 47' 49" 108° 16' 28"	T3S R97W Sec 10 NW1/4, SW1/4, SW1/4	N 181,074 E 1,220,571	6860'

* Plane Coordinate Projection Tables, Colorado, Special Publication No. 276, U.S. Government Printing Office.

ENVIRONMENTAL DATA COLLECTION STATION COORDINATES

STATION CODE	LATITUDE & LONGITUDE	TOWNSHIP & RANGE	STATE COORDINATES*	ELEVATION
BA08	39° 47' 33" 108° 16' 38"	T3S R97W Sec 16 NE1/4, SE1/4, NE1/4	N 179,497 E 1,218,748	6860'
BA09	39° 47' 9" 108° 16' 49"	T3S R97W Sec 16 SE1/4, NW1/4, SE1/4	N 177,108 E 1,218,805	6940'
BA10	39° 50' 48" 108° 14' 20"	T2S R97W Sec 25 SW1/4, SW1/4, NW1/4	N 198,868 E 1,231,137	6600'
BA11	39° 50' 46" 108° 13' 42"	T2S R97W Sec 25 SE1/4, NE1/4, SW1/4	N 198,554 E 1,234,091	6580'
BA12	39° 50' 29" 108° 13' 8"	T2S R97W Sec 25 SE1/4, SE1/4, SE1/4	N 196,731 E 1,236,668	6600'
BA13	39° 49' 52" 108° 12' 5"	T2S R96W Sec 31 SE1/4, NE1/4, SE1/4	N 192,834 E 1,241,451	6600'
BA14	39° 49' 52" 108° 10' 55"	T2S R96W Sec 33 SW1/4, NW1/4, SW1/4	N 192,645 E 1,246,920	6700'
BA15	39° 49' 46" 108° 10' 30"	T2S R96W Sec 33 NW1/4, SE1/4, SW1/4	N 192,079 E 1,248,868	6600'
BA16	39° 49' 56" 108° 14' 9"	T2S R97W Sec 36 NW1/4, NW1/4, SW1/4	N 193,525 E 1,231,828	6500'
BA17	39° 48' 32" 108° 14' 38"	T3S R97W Sec 11 SW1/4, NW1/4, NE1/4	N 185,097 E 1,229,308	6680'
BA18	39° 47' 49" 108° 14' 25"	T3S R97W Sec 14 NW1/4, NE1/4, NE1/4	N 180,760 E 1,230,131	6820'
BA19	39° 47' 56" 108° 14' 2"	T3S R97W Sec 12 NE1/4, SW1/4, SW1/4	N 181,451 E 1,232,017	6680'
BA20	39° 48' 0" 108° 12' 32"	T3S R96W Sec 7 SE1/4, SE1/4, NW1/4	N 182,142 E 1,238,554	6860'
BA21	39° 4' 6" 108° 12' 33"	T3S R96W Sec 7 NE1/4, SE1/4, SW1/4	N 181,640 E 1,239,057	6820'
BA22	39° 47' 4" 108° 12' 5"	T3S R96W Sec 18 SE1/4, NE1/4, SW1/4	N 176,165 E 1,238,742	6860'
BA23	39° 48' 51" 108° 12'	T3S R96W Sec 7 NE1/4, SE1/4, SE1/4	N 181,954 E 1,241,137	6840'

* Plane Coordinate Projection Tables, Colorado, Special Publication No. 276, U.S. Government Printing Office.

ENVIRONMENTAL DATA COLLECTION STATION COORDINATES

STATION CODE	LATITUDE & LONGITUDE	TOWNSHIP & RANGE	STATE COORDINATES*	ELEVATION
BA24	39° 48' 51" 108° 11' 51"	T3S R96W Sec 5 NE1/4, SW1/4, SW1/4	N 186,668 E 1,242,398	6640'
BA25	39° 47' 16" 108° 11' 46"	T3S, R96W Sec 17 NW1/4, NE1/4, SW1/4	N 177,045 E 1,242,457	7000'
BA26	39° 48' 8" 108° 10' 52"	T3S, R96W Sec 9 NW1/4, NW1/4, SW1/4	N 182,142 E 1,246,857	6840'
BA27	39° 47' 4" 108° 11' 13"	T3S R96W Sec 16 NW1/4, SW1/4, SW1/4	N 175,725 E 1,245,034	7020'
BA28	39° 48' 28" 108° 14' 29"	T3S R97W Sec 11 SE1/4, NW1/4, NE1/4	N 184,657 E 1,230,000	6680'
BA29a	39° 47' 43" 108° 14' 16"	T3S R97W Sec 14 NE1/4, NE1/4, NE1/4	N 180,068 E 1,230,885	6860'
BA29b	39° 47' 38" 108° 14' 23"	T3S R97W Sec 14 SW1/4, NE1/4, NE1/4	N 179,622 E 1,230,320	6900'
BA30	39° 48' 49" 108° 12' 35"	T3S R96W Sec 6 NE1/4, SE1/4, SW1/4	N 186,542 E 1,238,931	6720'
BA31	39° 48' 23" 108° 12' 40"	T3S R96W Sec 7 NE1/4, SE1/4, NW1/4	N 183,965 E 1,238,491	6820'
BC01	39° 47' 56" 108° 11' 58"	T3S R97W Sec 8 NW1/4, SW1/4, SW1/4	N 181,137 E 1,241,640	6860'
BC02	39° 47' 48" 108° 14' 22"	T3S R97W Sec 11 SW1/4, SE1/4, SE1/4	N 180,634 E 1,230,382	6860'
BC03	39° 46' 57" 108° 12' 1"	T3S R96W Sec 17 SW1/4 SW1/4, SW1/4	N 175,097 E 1,241,262	7100'
BC04	39° 47' 28" 108° 13' 32"	T3S R97W Sec 13 NW1/4, SW1/4, NE1/4	N 178,491 E 1,234,217	6700'
BC05	39° 48' 3" 108° 11' 58"	T3S R96W Sec 8 SE1/4, NW1/4, SW1/4	N 181,765 E 1,241,702	6840'
BC06	39° 47' 54" 108° 10' 44"	T3S R96W Sec 9 SE1/4, SW1/4, SW1/4	N 180,697 E 1,247,422	6900'
BC07	39° 47' 44" 108° 13' 17"	T3S R97W Sec 13 NW1/4, NE1/4, NE1/4	N 180,068 E 1,235,474	6940'

* Plane Coordinate Projection Tables, Colorado, Special Publication
No. 276, U. S. Government Printing Office.

ENVIRONMENTAL DATA COLLECTION STATION COORDINATES

STATION CODE	LATITUDE & LONGITUDE	TOWNSHIP & RANGE	STATE COORDINATES*	ELEVATION
BC08	39° 50' 30" 108° 13' 36"	T2S R97W Sec 25 NW1/4, SW1/4, SW1/4	N 196,920 E 1,234,468	6350'
BC09	39° 49' 30" 108° 11' 53"	T3S R96W Sec 5 NE1/4, NW1/4, NW1/4	N 190,634 E 1,242,331	6400'
BC13	39° 47' 19" 108° 11' 20"	T3S R96W Sec 17 NE1/4, NW1/4, SE1/4	N 177,234 E 1,244,531	6700'
BD01	39° 50' 59" 108° 14' 26"	T2S R97W Sec 26 SE1/4, SE1/4, NE1/4	N 200,000 E 1,230,697	6380'
BD02	39° 50' 44" 108° 13' 55"	T2S R97W Sec 25 NW1/4, NE1/4, SW1/4	N 198,428 E 1,233,022	6370'
BD03	39° 50' 34" 108° 12' 57"	T2S R96W Sec 30 SW1/4, SW1/4, SW1/4	N 197,171 E 1,237,548	6420'
BD04	39° 50' 3" 108° 12' 19"	T2S R96W Sec 31 SW1/4, SE1/4, NE1/4	N 194,028 E 1,240,445	6420'
BD05	39° 50' 9" 108° 11' 41"	T2S R96W Sec 32 NW1/4, SE1/4, NW1/4	N 194,468 E 1,243,400	6420'
BD06	39° 49' 46" 108° 10' 34"	T2S R96W Sec 33 NW1/4, SE1/4, SW1/4	N 192,017 E 1,248,554	6500'
BD07	39° 49' 51" 108° 13' 16"	T2S R97W Sec 36 SW1/4, NE1/4, SE1/4	N 192,897 E 1,235,914	6380'
BD08	39° 49' 46" 108° 12' 43"	T2S R96W Sec 31 NW1/4, SE1/4, SW1/4	N 192,394 E 1,238,491	6360'
BD09	39° 49' 26" 108° 12' 28"	T3S R96W Sec 6 SW1/4, NW1/4, NE1/4	N 190,257 E 1,239,559	6410'
BD10	39° 49' 17" 108° 11' 49"	T3S R96W Sec 5 NE1/4, SW1/4, NW1/4	N 189,245 E 1,242,582	6420'
Coordinates Picked Near Transect Map Code Level				
BF01	39° 47' 53" 108° 16' 35"	T3S R97W Sec 9 NE1/4, SE1/4, SE1/4	N 181,514 E 1,220,068	6900'
BF02	39° 48' 02" 108° 14' 27"	T3S R97W Sec 11 SW1/4, NE1/4, SE1/4	N 182,017 E 1,230,068	6800'
BF03	39° 46' 40" 108° 13' 32"	T3S R97W Sec 24 NW1/4, SW1/4, NE1/4	N 173,651 E 1,234,091	6860'

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ENVIRONMENTAL DATA COLLECTION STATION COORDINATES

STATION CODE	LATITUDE & LONGITUDE	TOWNSHIP & RANGE	STATE COORDINATES*	ELEVATION
BF04	39° 46' 25" 108° 13' 04"	T3S R97W Sec 24 NE1/4, NE1/4, SE1/4	N 172,017 E 1,236,228	7190'
BF05	39° 47' 30" 108° 12' 9"	T3S R96W Sec 18 NE1/4, SE1/4, NE1/4	N 178,491 E 1,240,697	6980'
BF06	39° 47' 44" 108° 11' 43"	T3S R96W Sec 17 NW1/4, NE1/4, NW1/4	N 179,874 E 1,242,771	6940'
BF07	39° 46' 09" 108° 11' 49"	T3S R96W Sec 20 SW1/4, SE1/4, SW1/4	N 170,257 E 1,242,017	6820'
BF08	39° 47' 31" 108° 11' 9"	T3S R96W Sec 16 NE1/4, SW1/4, NW1/4	N 178,491 E 1,245,411	6950'
BG01	39° 50' 17" 108° 13' 58"	T2S R97W Sec 36 SW1/4, NE1/4, NW1/4	N 195,662 E 1,232,708	6360'
BG02	39° 47' 46" 108° 13' 23"	T3S R97W Sec 13 NE1/4, NW1/4, NE1/4	N 180,320 E 1,234,971	6940'
BG03	39° 49' 39" 108° 12' 10"	T2S R96W Sec 31 SE1/4, SE1/4, SE1/4	N 191,577 E 1,241,011	6300'
BG04	39° 47' 40" 108° 10' 55"	T3S R96W Sec 16 SW1/4, NW1/4, NW1/4	N 179,371 E 1,246,542	6860'
BH01	39° 48' 46" 108° 15' 59"	T3S R97W Sec 5 SE1/4, SE1/4, SW1/4	N 186,731 E 1,223,022	6660'
BH02	39° 47' 59" 108° 13' 38"	T3S R97W Sec 12 SW1/4, SW1/4, SE1/4	N 181,640 E 1,233,902	6780'
BH03	39° 48' 14" 108° 13' 1"	T3S R96W Sec 7 SW1/4, NW1/4, SW1/4	N 183,085 E 1,236,794	6840'
BH04	39° 46' 48" 108° 10' 56"	T3S R96W Sec 20 NE1/4, SE1/4, NE1/4	N 174,091 E 1,246,291	7120'
BJ01	39° 47' 56" 108° 11' 58"	T3S R96W Sec 8 NW1/4, SW1/4, SW1/4	N 181,137 E 1,241,640	6860'
BJ02	39° 47' 43" 108° 14' 23"	T3S R97W Sec 14 NW1/4, NE1/4, NE1/4	N 180,194 E 1,230,320	6870'
BJ03	39° 46' 58" 108° 12' 3"	T3S R96W Sec 17 SW1/4, SW1/4, SW1/4	N 175,285 E 1,241,074	7100'

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ENVIRONMENTAL DATA COLLECTION STATION COORDINATES

STATION CODE	LATITUDE & LONGITUDE	TOWNSHIP & RANGE	STATE COORDINATES*	ELEVATION
BJ04	39° 47' 24" 108° 13' 30"	T3S R97W Sec 13 SE1/4, SW1/4, NE1/4	N 178,114 E 1,234,405	6700'
BJ05	39° 48' 08" 108° 11' 54"	T3S R96W Sec 8 SE1/4, NW1/4, SW1/4	N 182,268 E 1,242,017	6840'
BJ06	39° 47' 53" 108° 10' 42"	T3S R96W Sec 9 SE1/4, SW1/4, SW1/4	N 180,634 E 1,247,611	6880'

III. NOISE

NA02	39° 50' 43" 108° 14' 19"	T2S R97W Sec 25 SW1/4, NW1/4, SW1/4	N 198,302 E 1,231,200	6520'
NA09	39° 49' 08" 108° 14' 17"	T3S R97W Sec 2 SE1/4, SE1/4, NE1/4	N 188,679 E 1,231,074	6660'
NA22	39° 50' 43" 108° 14' 19"	T2S R97W Sec 25 SW1/4, NW1/4, SW1/4	N 198,302 E 1,231,200	6520'
NB01		TS35 R96W Sec 1	N 187,422 E 1,234,405	
NB15	39° 49' 04" 108° 13' 26"	T3S R97W Sec 1 NE1/4, NW1/4, SE1/4	N 188,177 E 1,234,971	6720'

IV. PHOTOGRAPHY

PA01	39° 51' 50" 108° 11' 23"	T2S R96W Sec 20 SW1/4, SW1/4, NE1/4	N 204,714 E 1,245,097	7420'
PA02	39° 50' 44" 108° 14' 5"	T2S R97W Sec 25 SE1/4, NW1/4, SW1/4	N 198,365 E 1,232,268	6560'
PA03	39° 50' 23" 108° 14' 7"	T2S R97W Sec 36 NE1/4, NW1/4, NW1/4	N 196,291 E 1,232,079	6300'
PA04	39° 49' 58" 108° 13' 11"	T2S R97W Sec 26 NE1/4, NE1/4, SE1/4	N 193,651 E 1,236,354	6410'
PA05	39° 49' 03" 108° 14' 41"	T3S R97W Sec 2 NW1/4, NW1/4, SE1/4	N 188,239 E 1,229,119	6410'
PA06	39° 48' 55" 108° 14' 5"	T3S R97W Sec 1 SW1/4, NW1/4, SW1/4	N 187,422 E 1,231,954	6770'
PA07	39° 48' 55" 108° 13' 57"	T3S R97W Sec 1 SE1/4, NW1/4, SW1/4	N 187,359 E 1,232,582	6770'

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ENVIRONMENTAL DATA COLLECTION STATION COORDINATES

STATION CODE	LATITUDE & LONGITUDE	TOWNSHIP & RANGE	STATE COORDINATES*	ELEVATION
PA08	39° 49' 18" 108° 13' 49"	T3S R97W Sec 1 NW1/4, SE1/4, NW1/4	N 189,685 E 1,233,274	6760'
PA09	39° 48' 53" 108° 12' 20"	T3S R96W Sec 6 NE1/4, SW1/4, SE1/4	N 186,920 E 1,240,131	6750'
PA10	39° 49' 30" 108° 11' 50"	T3S R96W Sec 5 NE1/4, NW1/4, NW1/4	N 190,634 E 1,242,582	6430'
PA11	39° 48' 41" 108° 11' 47"	T3S R96W Sec 5 SW1/4, SE1/4, SW1/4	N 185,662 E 1,242,645	6700'
PA12	39° 48' 47" 108° 11' 28"	T3S R96W Sec 5 SW1/4, SW1/4, SE1/4	N 186,228 E 1,244,154	6740'
PA13	39° 49' 33" 108° 11' 44"	T2S R96W Sec 32 SE1/4, SW1/4, SE1/4	N 190,885 E 1,243,085	6500'
PA14	39° 48' 22" 108° 14' 29"	T3S R97W Sec 11 NE1/4, SW1/4, NE1/4	N 184,091 E 1,229,937	6700'
PA15	39° 48' 21" 108° 14' 3"	T3S R97W Sec 12 NE1/4, SW1/4, NW1/4	N 183,902 E 1,232,017	6670'
PA16	39° 47' 56" 108° 13' 49"	T3S R97W Sec 12 NE1/4, SE1/4, SW1/4	N 181,325 E 1,233,022	6730'
PA17	39° 48' 35" 108° 13' 19"	T3S R97W Sec 12 NW1/4, NE1/4, NE1/4	N 185,285 E 1,235,474	6760'
PA18	39° 48' 31" 108° 13' 10"	T3S R97W Sec 12 SW1/4, NE1/4, NE1/4	N 184,782 E 1,236,165	6820'
PA19	39° 47' 50" 108° 12' 57"	T3S R96W Sec 7 SW1/4, SW1/4, SW1/4	N 180,697 E 1,237,045	6870'
PA20	39° 48' 4" 108° 12' 47"	T3S R96W Sec 7 SW1/4, NE1/4, SW1/4	N 182,017 E 1,237,862	6890'
PA21	39° 47' 46" 108° 12' 5"	T3S R96W Sec 18 NE1/4, NE1/4, NE1/4	N 180,068 E 1,241,074	6920'
PA22	39° 48' 16" 108° 11' 34"	T3S R96W Sec 8 SE1/4, SE1/4, NW1/4	N 183,085 E 1,243,588	6860'
PA23	39° 48' 38" 108° 10' 57"	T3S R96W Sec 8 NE1/4, NE1/4, NE1/4	E 185,222 E 1,246,542	6540'

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ENVIRONMENTAL DATA COLLECTION STATION COORDINATES

STATION CODE	LATITUDE & LONGITUDE	TOWNSHIP & RANGE	STATE COORDINATES*	ELEVATION
PA24	39° 47' 57" 108° 10' 44"	T3S R96W Sec 9 NE1/4, SW1/4, SW1/4	N 181,074 E 1,247,422	6880'
PA25	39° 48' 10" 108° 10' 24"	T3S R96W Sec 9 NE1/4, NE1/4, SW1/4	N 182,268 E 1,248,994	6520'
PA26	39° 47' 25" 108° 13' 39"	T3S R97W Sec 13 SE1/4, SE1/4, NW1/4	N 178,239 E 1,233,714	6770'
PA27	39° 47' 22" 108° 12' 58"	T3S R96W Sec 18 SW1/4, SW1/4, NW1/4	N 177,862 E 1,236,857	6980'
PA28	39° 47' 8" 108° 12' 58"	T3S R96W Sec 18 NW1/4, SW1/4, SW1/4	N 176,417 E 1,236,794	7010'
PA29	39° 46' 57" 108° 11' 20"	T3S R96W Sec 17 SW1/4, SW1/4, SE1/4	N 175,034 E 1,244,405	6700'
PA30	39° 46' 58" 108° 10' 48"	T3S R96W Sec 16 SW1/4, SW1/4, SW1/4	N 175,034 E 1,246,920	7120'
PA31	39° 47' 46" 108° 10' 45"	T3S R96W Sec 16 NE1/4, NW1/4, NW1/4	N 179,874 E 1,247,359	6920'
PA32	39° 47' 25" 108° 10' 18"	T3S R96W Sec 16 SW1/4, SW1/4, NE1/4	N 177,737 E 1,249,371	6640'
PA33	39° 46' 58" 108° 13' 00"	T3S R96W Sec 18 SW1/4, SW1/4, SW1/4	N 175,411 E 1,236,605	7060'
PA34	39° 46' 53" 108° 12' 5"	T3S R96W Sec 19 NE1/4, NE1/4, NE1/4	N 174,720 E 1,240,948	7120'
PA35	39° 45' 21" 108° 13' 6"	T3S R97W Sec 25 NE1/4, SE1/4, SE1/4	N 165,537 E 1,235,851	7400'

V. WATER

WA01	39° 50' 31" 108° 13' 54"	T2S R97W Sec 25 SW1/4, SE1/4, SW1/4	N 197,108 E 1,233,085	6300'
WA02	39° 50' 10" 108° 14' 37"	T2S R97W Sec 35 NE1/4, SW1/4, NE1/4	N 195,034 E 1,229,685	6280'
WA03	39° 48' 48" 108° 14' 32"	T3S R97W Sec 2 NE1/4, SW1/4, SE1/4	N 186,731 E 1,229,811	6460'

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ENVIRONMENTAL DATA COLLECTION STATION COORDINATES

STATION CODE	LATITUDE & LONGITUDE	TOWNSHIP & RANGE	STATE COORDINATES*	ELEVATION
WA04	39° 47' 26" 108° 13' 35"	T3S R97W Sec 13 SW1/4, SW1/4, NE1/4	N 178,302 E 1,234,028	6700'
WA05	39° 50' 4" 108° 13' 14"	T2S R97W Sec 36 SW1/4, SE1/4, NE1/4	N 194,217 E 1,236,102	6330'
WA06	39° 49' 36" 108° 12' 25"	T2S R96W Sec 31 SE1/4, SW1/4, SE1/4	N 191,262 E 1,239,874	6360'
WA07	39° 49' 31" 108° 11' 59"	T3S R96W Sec 5 NW1/4, NW1/4, NW1/4	N 190,697 E 1,241,891	6370'
WA08	39° 49' 12" 108° 11' 8"	T3S R96W Sec 5 SW1/4, SE1/4, NE1/4	N 188,679 E 1,245,788	6400'
WA09	39° 48' 10" 108° 10' 22"	T3S R96W Sec 9 NE1/4, NE1/4, SW1/4	N 182,268 E 1,249,182	6420'
WA10	39° 47' 25" 108° 10' 24"	T3S R96W Sec 16 SE1/4, SE1/4, NW1/4	N 177,800 E 1,248,931	6580'
WA11	39° 48' 18" 108° 11' 7"	T3S R96W Sec 8 SW1/4, SE1/4, NE1/4	N 183,211 E 1,245,725	6550'
WA12	39° 46' 58" 108° 11' 25"	T3S R96W Sec 17 SW1/4, SW1/4, SE1/4	N 175,159 E 1,244,028	6700'
WA13	39° 47' 13" 108° 12' 34"	T3S R96W Sec 18 SW1/4, NW1/4, SE1/4	N 176,857 E 1,238,679	6840'
WC91/WD91 WE91/WG91	39° 47' 48" 108° 14' 20"	T3S R97W Sec 11 SE1/4, SE1/4, SE1/4	N 180,634 E 1,230,571	6873.0'
WC17/WD17 WE17/WG17	39° 46' 58" 108° 10' 51"	T3S R96W Sec 16 SW1/4, SW1/4, SW1/4	N 175,034 E 1,246,668	7038.6'
WD01	39° 48' 52" 108° 14' 3"	T3S R96W Sec 1 NE1/4, SW1/4, SW1/4	N 187,045 E 1,232,079	6763.4'
WD02	39° 48' 56" 108° 12' 22"	T3S R96W Sec 6 SE1/4, NW1/4, SE1/4	N 197,234 E 1,240,000	6737.0'
WD11/WE11	39° 48' 52" 108° 14' 35"	T3S R96W Sec 2 NW1/4, SE1/4	N 187,171 E 1,229,600	6425.0'
WD12/WG12	39° 48' 52" 108° 14' 36"	T3S R97W Sec 2 NE1/4, SW1/4, SE1/4	N 187,171 E 1,229,497	6428.8'

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ENVIRONMENTAL DATA COLLECTION STATION COORDINATES

STATION CODE	LATITUDE & LONGITUDE	TOWNSHIP & RANGE	STATE COORDINATES*	ELEVATION
WD14/WD15		T3S R96W Sec 7 NE1/4, SW1/4	N 180,200 E 1,238,300	6909.0'
WD18/WE18 WG18	39° 45' 19" 108° 13' 08"	T3S R97W Sec 25 SE1/4, SE1/4	N 165,438 E 1,235,125	7386.6'
WD19	39° 49' 31" 108° 11' 59"	T3S R96W Sec 5 NW1/4, NW1/4, NW1/4	N 190,760 E 1,241,891	6384.4'
WD20/WE20 WG20	39° 49' 33" 108° 12' 24"	T3S R96W Sec 31 SE1/4, SW1/4, SE1/4	N 191,011 E 1,239,937	6358.0'
WD21/WE21 WG21/WH21	39° 48' 57" 108° 13' 24"	T3S R97W Sec 13 SE1/4, SW1/4, SE1/4	N 175,348 E 1,234,782	6813.3'
WD41/WE41 WG41	39° 38' 21" 112° 10' 06"	T3S R96W Sec 7 NE1/4, SW1/4	N 182,000 E 1,238,000	6909.0'
WD51/WE51 WG51	39° 47' 36" 108° 13' 06"	T3S R97W Sec 13 NE1/4, NE1/4, NE1/4	N 180,257 E 1,236,291	6953.6'
WD52/WE52 WG52	39° 47' 48" 108° 12' 7"	T3S R96W Sec 7 SE1/4, SE1/4, SE1/4	N 180,320 E 1,240,948	6903.1'
WD57	39° 46' 47" 108° 10' 51"	T3S R96W Sec 16 SW1/4, SW1/4, SW1/4	N 175,034 E 1,246,668	7036.0'
WD61/WE61 WG61	39° 48' 13" 108° 12' 32"	T3S R96W Sec 7 NW1/4, NW1/4, SE1/4	N 182,897 E 1,239,057	6890.7'
WD90	39° 47' 46" 108° 13' 05"	T3S R97W Sec 13 NE1/4, NE1/4	N 180,312 E 1,236,375	6952.5'
WE03	39° 48' 51" 108° 11' 29"	T3S R96W Sec 5 NW1/4, SW1/4, SE1/4	N 186,605 E 1,244,091	6743.1'
WE04	39° 47' 11" 108° 12' 4"	T3S R96W Sec 17 SE1/4, NW1/4, SW1/4	N 176,542 E 1,241,074	7057.3'
WI17				
WI18	39° 47' 46" 108° 13' 05"		N 180,300 E 1,236,375	6950.0'
WI19				
WP01	39° 49' 35" 108° 11' 2"	T2S R96W Sec 32 SE1/4, SE1/4, SE1/4	N 190,948 E 1,246,291	6380'

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ENVIRONMENTAL DATA COLLECTION STATION COORDINATES

STATION CODE	LATITUDE & LONGITUDE	TOWNSHIP & RANGE	STATE COORDINATES*	ELEVATION
WP02	39° 49' 41" 108° 12' 2"	T2S R96W Sec 32 NW1/4, SW1/4, SW1/4	N 1,191,702 E 1,241,702	6300'
WP03	39° 51' 03" 108° 15' 27"	T2S R97W Sec 26 NW1/4, SW1/4, NW1/4	N 200,502 E 1,225,977	6220'
WR01	40° 00' 108° 12'	T1S R96W Sec 6	OFF TRACT	6140'
WR02	40° 02'	T1N R94W Sec 7	OFF TRACT	6347'
WR03		T4S R97W Sec 34	OFF TRACT	
WR04		T2S R100W Sec 14	OFF TRACT	
WR05		T5S R94W Sec 26	OFF TRACT	
WR06		T6S R94W Sec 2	OFF TRACT	
WR07			OFF TRACT	
WS01	39° 49' 30" 108° 11' 2"	T3S R96W Sec 5 NE1/4, NE1/4, NE1/4	N 190,445 E 1,246,291	6380'
WS02	39° 48' 3" 108° 10' 16"	T3S R96W Sec 9 SW1/4, NW1/4, SE1/4	N 181,577 E 1,249,622	6540'
WS03	39° 49' 1" 108° 11' 9"	T3S R96W Sec 5 NW1/4, NE1/4, NE1/4	N 190,634 E 1,245,788	6360'
WS04	39° 48' 1" 108° 10' 13"	T3S R96W Sec 9 NE1/4, SW1/4, SE1/4	N 181,388 E 1,249,874	6550'
WS06	39° 50' 23" 108° 14' 38"	T2S R97W Sec 35 NE1/4, NW1/4, NE1/4	N 196,354 E 1,229,622	6260'
WS07	39° 50' 17" 108° 14' 33"	T2S R97W Sec 35 SW1/4, NE1/4, NE1/4	N 195,788 E 1,230,000	6280'
WS08	39° 48' 57" 108° 14' 48"	T3S R97W Sec 11 SE1/4, NE1/4, SE1/4	N 187,674 E 1,228,554	6400'
WS09	39° 47' 51" 108° 14' 53"	T3S R97W Sec 14 NW1/4, NE1/4, SW1/4	N 181,011 E 1,227,988	6550'
WS10	39° 47' 16" 108° 15' 2"	T3S R97W Sec 2 SE1/4, NE1/4, SW1/4	N 177,485 E 1,227,171	6580'

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ENVIRONMENTAL DATA COLLECTION STATION COORDINATES

STATION CODE	LATITUDE & LONGITUDE	TOWNSHIP & RANGE	STATE COORDINATES*	ELEVATION
WS11			N 182,900 E 1,238,400	
WS12			N 194,800 E 1,236,300	
WS21	39° 51' 20" 108° 19' 15"	T2S, R97W, Sec 19 SW1/4, SE1/4	OFF TRACT	
WS22	39° 49' 29" 108° 24' 56"	T2S, R98W, Sec 32 SW1/4, SE1/4	OFF TRACT	
WS23	39° 47' 22" 108° 17' 57"	T3S, R97W, Sec 17 NW1/4, SE1/4	OFF TRACT	
WS24	39° 46' 27" 108° 22' 43"	T3S, R98W, Sec 22 NW1/4, SE1/4	OFF TRACT	
WS25	39° 42' 56" 108° 29' 03"	T4S, R99W, Sec 10 NE1/4, SE1/4	OFF TRACT	
WS26	39° 47' 37" 108° 15' 51"	T3S, R97W, Sec 27 Center	OFF TRACT	
WS27	39° 40' 51" 108° 16' 50"	T4S, R97W, Sec 21 SW1/4, SE1/4	OFF TRACT	
WS28	39° 44' 50" 108° 10' 05"	T3S, R96W, Sec 33 SW1/4, NE1/4	OFF TRACT	
WS29	39° 40' 55" 108° 12' 50"	T4S, R96W, Sec 19 SW1/4, SW1/4	OFF TRACT	
WS30	39° 47' 42" 108° 06' 09"	T3S, R95W, Sec 18 NW1/4, NW1/4	OFF TRACT	
WS31	39° 48' 25" 108° 10' 34"	T3S, R96W, Sec 9 SE1/4, NW1/4	N 184,187 E 1,248,184	
WS32	39° 47' 36" 108° 14' 59"	T3S, R97W, Sec 14 NE1/4, NW1/4	OFF TRACT	
WS33	39° 47' 18" 108° 10' 22"	T3S, R96W, Sec 16 NE1/4, SW1/4	OFF TRACT	
WS34	39° 47' 17" 108° 15' 03"	T3S, R97W, Sec 14 NW1/4, SW1/4	OFF TRACT	

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ENVIRONMENTAL DATA COLLECTION STATION COORDINATES

STATION CODE+	LATITUDE & LONGITUDE	TOWNSHIP & RANGE	STATE COORDINATES*	ELEVATION
WS36	39° 48' 42" 108° 10' 52"		N 185,500 E 1,247,000	
WU01	39° 46' 10" 108° 15' 16"	T3S R97W Sec 22 E1/4, N1/4, E1/4	N 170,875 E 1,225,875	
WU02		T3S R97W Sec 8 SE1/4, S1/4, E1/4	OFF TRACT	
WU07	39° 49' 31" 108° 10' 59"	T3S R96W Sec 5 NE1/4, NE1/4, NE1/4	N 190,634 E 1,246,542	6400
WU15	39° 47' 20" 108° 10' 23"	T3S R96W Sec 16 NE1/4, NE1/4, SW1/4	N 177,234 E 1,248,931	6600
WU22	39° 48' 45" 108° 10' 60"	T3S R96W Sec 5 SE1/4, SE1/4, SE1/4	N 185,914 E 1,246,354	6460
WU25	39° 46' 57" 108° 11' 21"	T3S R96W Sec 17 SE1/4, SW1/4, SE1/4	N 175,097 E 1,244,342	6680'
WU28	39° 48' 42" 108° 11' 0	T3S R96W Sec 5 SE1/4, SE1/4, SE1/4	N 185,662 E 1,246,291	6460'
WU33	39° 47' 15" 108° 12' 34"	T3S R96W Sec 18 SE1/4, NE1/4, SW1/4	N 177,045 E 1,238,742	6860'
WU36	39° 49' 28" 108° 11' 54"	T3S R96W Sec 5 NE1/4, NW1/4, NW1/4	N 190,382 E 1,242,268	6380'
WU39	39° 49' 34" 108° 12' 27"	T2S R96W Sec 31 SW1/4, SW1/4, SE1/4	N 191,137 E 1,239,685	6380'
WU42	39° 50' 3" 108° 13' 13"	T2S R97W Sec 36 SE1/4, SE1/4, NE1/4	N 194,091 E 1,236,228	6430'
WU45	39° 50' 8" 108° 13' 14"	T2S R97W Sec 36 SE1/4, NE1/4		
WU50	39° 47' 43" 108° 13' 39"	T3S R97W Sec 13 NE1/4, NE1/4, NW1/4	N 180,000 E 1,233,714	6660'
WU52	39° 48' 49" 108° 14' 34"	T3S R97W Sec 2 NE1/4, SW1/4, SE1/4	N 186,857 E 1,229,685	6460'
WU58	39° 50' 12" 108° 14' 36"	T2S R97W Sec 35 NE1/4, SW1/4, NE1/4	N 195,222 E 1,229,748	6280'

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ENVIRONMENTAL DATA COLLECTION STATION COORDINATES

STATION CODE+	LATITUDE & LONGITUDE	TOWNSHIP & RANGE	STATE COORDINATES*	ELEVATION
WU61	39° 51' 3" 108° 15' 31"	T2S R97W Sec 27 NE1/4, SE1/4, NE1/4	N 220,502 E 1,225,600	6220'
WV01	39° 49' 26" 108° 16' 39"	T3S R97W Sec 4	OFF TRACT	6411'
WV02	39° 48' 35" 108° 08' 49"	T3S R96W Sec 10	OFF TRACT	6490'
WV03	39° 48' 00" 108° 05' 11"			
WV04	41° 09' 19" 108° 13' 28"	T4S R96W Sec 9	N 675,219 E 1,249,792	
WV05	39° 41' 53" 108° 05' 24"	T4S R95W Sec 18	OFF TRACT	7420'
WV37	39° 48' 01" 108° 12' 42"	T3S R96W Sec 7 NE1/4, SW1/4	N 181,750 E 1,238,250	6909.0'
WV40	39° 48' 01" 108° 12' 14"	T3S R96W Sec 7 NE1/4, SW1/4	N 181,750 E 1,238,125	6909.0'
WW12	39° 48' 42" 108° 13' 29"	T3S R97W Sec 1 SE1/4, SW1/4, SE1/4	N 185,977 E 1,234,720	6780'
WW13	39° 47' 46" 108° 13' 05"		N 180,272 E 1,236,438	6953.6'
WW22	39° 48' 42" 108° 13' 29"	T3S R97W Sec 1 SE1/4, SW1/4, SE1/4	N 185,977 E 1,234,720	6764.0'
WX02	39° 48' 56" 108° 12' 22"	T3S R96W Sec 6 SE1/4, NW1/4, SE1/4	N 187,234 E 1,240,000	6730'
WX04	39° 47' 11" 108° 12' 4"	T3S R96W Sec 17 SE1/4, NW1/4, SW1/4	N 176,542 E 1,241,074	7040'
WX10	39° 47' 46" 108° 13' 06"	T3S R97W Sec 13 NE1/4, NE1/4, NE1/4	N 180,257 E 1,236,291	6950'
WX12/WY12	39° 48' 52" 108° 14' 36"	T3S R97W Sec 2 NE1/4, SW1/4, SE1/4	N 187,171 E 1,229,497	6440'

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ENVIRONMENTAL DATA COLLECTION STATION COORDINATES

STATION CODE+	LATITUDE & LONGITUDE	TOWNSHIP & RANGE	STATE COORDINATES*	ELEVATION
WX17/WY17	39° 46' 58" 108° 10' 51"	T3S R96W Sec 16 SW1/4, SW1/4, SW1/4	N 175,034 E 1,246,668	7040'
WX19	39° 49' 31" 108° 11' 59"	T3S R96W Sec 5 NW1/4, NW1/4, NW1/4	N 190,760 E 1,241,891	6370'
WX20	39° 49' 33" 108° 12' 24"	T2S R96W Sec 31 SE1/4, SW1/4, SE1/4	N 191,011 E 1,239,937	6350'
WX21	39° 48' 57" 108° 13' 24"	T3S R97W Sec 13 SE1/4, SW1/4, SE1/4	N 175,348 E 1,234,782	6870'
WX32	39° 48' 26" 108° 13' 36"	T3S R97W Sec 12 NW1/4, SW1/4, NE1/4	N 184,342 E 1,234,091	6840'
WX33	39° 49' 0" 108° 13' 28"	T3S R97W Sec 1 SE1/4, NW1/4, SE1/4	N 187,800 E 1,234,845	6720'
WX38	39° 48' 05" 108° 12' 40"	T3S R96W Sec 7 NE1/4, SW1/4	N 182,100 E 1,238,400	6909.0'
WX41	39° 49' 32" 108° 13' 08"		N 191,000 E 1,236,500	6460.0'
WX44/WY45 /WY46	39° 48' 1" 108° 12' 44"	T3S R96W Sec 7 SW1/4, NE1/4, SW1/4	N 181,765 E 1,238,114	6910'
WX55/WY52 /WY54	39° 47' 48" 108° 12' 7"	T3S R96W Sec 7 SE1/4, SE1/4, SE1/4	N 180,320 E 1,240,948	6900'
WX63/WY61 WY62	39° 48' 13" 108° 12' 32"	T3S R96W Sec 7 NW1/4, NW1/4, SE1/4	N 182,897 E 1,239,057	6870'
WX64/WY64	39° 55' 16" 108° 13' 01"		OFF TRACT	7178.0'
WX65/WY65	39° 51' 36" 108° 21' 00"		OFF TRACT	6390.0'
WX67/WY67	39° 52' 55" 108° 15' 42"		OFF TRACT	6740.0'
WX69/WY69	39° 53' 10" 108° 05' 04"		OFF TRACT	7350.0'
WX71/WY71	39° 47' 47" 108° 21' 49"	T3S R98W Sec 11	OFF TRACT	6580.0'

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STATION CODE+	LATITUDE & LONGITUDE	TOWNSHIP & RANGE	STATE COORDINATES*	ELEVATION
WX72/WY72	39° 45' 40" 108° 19' 12"		OFF TRACT	6805.0'
WX73	41° 09' 26" 108° 08' 15"	T4S R95W Sec 32	N 675,219 E 1,273,792	8142.3'
WX74			OFF TRACT	
WX75	41° 08' 48" 108° 09' 03"	T5S R95W Sec 6	N 671,467.4 E 1,269,951.5	7583.2'
WX82	39° 48' 13" 108° 10' 13"		N 182,562 E 1,249,938	6909.0'
WX92/WY91	39° 47' 48" 108° 14' 20"	T3S R97W Sec 11 SE1/4, SE1/4, SE1/4	N 180,634 E 1,230,571	6870'
WY01 1	39° 48' 52" 108° 14' 3"	T3S R97W Sec 1 NE1/4, SW1/4, SW1/4	N 187,045 E 1,232,079	6780'
WY03 2	39° 48' 51" 108° 11' 29"	T3S R96W Sec 5 NW1/4, SW1/4, SE1/4	N 186,605 E 1,244,091	6740'
WY44 3	39° 48' 01" 108° 12' 44"		N 181,772 E 1,238,125	6909.0'
WY66 4	39° 50' 41" 108° 16' 04"	T2S R97W Sec 27	OFF TRACT	6286.0'
WY68 5	39° 45' 55" 108° 12' 31"		OFF TRACT	6840.0'
WY70 6	39° 45' 51" → 108° 28' 01" 108° 12' 58"	T3S R99W Sec 26 T4S R96W Sec 6	OFF TRACT OFF TRACT	7070.0' 7145.0'
WY75 7	39° 45' 59" → 108° 21' 49" 108° 25' 35"	T3S R96W Sec 29	N 169,250 E 1,242,500	6820.0' 7020.0'
WY76 8	39° 45' 02" → 108° 10' 04" 108° 10' 24"	T3S R96W Sec 33 T3S R96W Sec 9 NE1/4, NE1/4, SW1/4	OFF TRACT N 182,457 E 1,249,057	6865.0' 6540'

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ENVIRONMENTAL DATA COLLECTION STATION COORDINATES

STATION CODE+	LATITUDE & LONGITUDE	TOWNSHIP & RANGE	STATE COORDINATES*	ELEVATION
WY77 7	41° 08' 44" → 108° 21' 09" 108° 13' 20"	SE1/4, NW1/4, SE1/4	N 672,812 E 1,214,479 E 1,235,461	7777.8' 6720'
WY78 10	39° 43' 53" 108° 12' 58"	T4S R96W Sec 6	OFF TRACT	7145.0'
WY79 11	39° 51' 10" 108° 25' 35"	T2S R98W Sec 30	OFF TRACT	7020.0'
WY81 12	39° 48' 12" 108° 10' 24"	T3S R96W Sec 9 NE1/4, NE1/4, SW1/4	N 182,457 E 1,249,057	6540'
WZ01 13	39° 42' 02" 108° 13' 20"	T3S R96W Sec 1 NE1/4, NW1/4, SE1/4	N 188,015 E 1,235,461	6720'
WZ02 14	39° 48' 28" 108° 13' 27"		N 184,592 E 1,234,798	
WZ03 15	39° 48' 26" 108° 13' 28"		N 184,306 E 1,234,705	

* Plane Coordinate Projection Tables, Colorado, Special Publication No 276, U.S. Government Printing Office.

+ Multiple station codes at the same location indicates samples taken at different depths.

Associated
83N 8½ x 11½

5.0 Special Reports

This section contains the following reports:

- Water Quality Analysis of Effluent on Tract C-b
- Water Quality Analysis of Alluvial Wells on Tract C-b
- Results from Polynuclear Aromatic Hydrocarbon Analyses for Well Water Samples from Tract C-b

Kaman Tempo

A DIVISION OF KAMAN SCIENCES CORPORATION

DENVER OFFICE

**Cherry Creek Plaza II
650 South Cherry Street, Suite 310
Denver, Colorado 80222
Telephone (303) 393-0551**

October 30, 1981

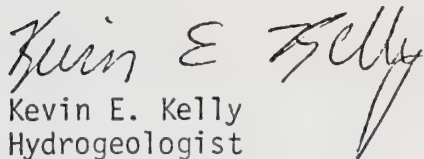
Mr. Ed Baker
Cathedral Bluffs Shale Oil Company
Star Route
Rifle, CO 81650

Dear Ed:

Pursuant to our conversation on 30 October 1981, enclosed please find for your review the analytical results from Tempo's sampling plan. As I indicated in the sampling plan sent to you on 9 September 1981, the sampling will be conducted on a monthly basis for a year. Therefore, I'll send you the results each month.

If you have any questions or comments, please give me a call at the above number.

Sincerely,



Kevin E. Kelly
Hydrogeologist
Natural Resources Program

KEK;kdw

Enclosure

CORE LABORATORIES, INC.
ANALYTICAL REPORT

CLIENT IDENTIFICATION

JOB NO.: 6307-W81396
COMPANY: KAMAN TEMPO
JOB/GROUP REMARKS:

IDENTIFICATION

1) D-8

3) D-6

5) J.F.

7) DIS. TO B

IDENTIFICATION

2) W-0

(4) DIS. TO A

6) DIS. FROM 4B

8) W-I

CORE LABORATORIES, INC. ANALYTICAL REPORT

21-OCT-81

KAMAN TEMPO

RESULTS OF WATER QUALITY ANALYSIS ON SAMPLES COLLECTED AT LOCATION:

JOB NO. 6307-	W81396 - 1	W81396 - 2	W81396 - 3	W81396 - 4	W81396 - 5	W81396 - 6
SAMPLE ID:	D-8	W-0	D-6	DIS. TO A	J.P.	DIS. FROM 0B
SAMPLE REMARKS:						
DATE/TIME SAMPLED	09-17-81/	09-17-81/	09-17-81/	09-17-81/	09-17-81/	09-16-81/
DATE/TIME RECEIVED	09-18-81/1600	09-18-81/1600	09-18-81/1600	09-18-81/1600	09-18-81/1600	09-18-81/1600
DATE/TIME ANALYZED	09-21-81/ 900	09-21-81/ 900	09-21-81/ 900	09-21-81/ 900	09-21-81/ 900	09-21-81/ 900

CHEMIST: RIF/DRH

LOCATION: AURORA, CO

LAB PH @ 25 DEG. C) ☒ 8.18
 LAB COND. (UMHOS @ 25 DEG. C) ☒ 1458
 DISSOLVED OXYGEN (DO) ☒ <1

---ALL VALUES REPORTED ON A DISSOLVED BASIS (MG./L.) UNLESS INDICATED OTHERWISE

☒ 8.49 ☒ 8.28 ☒ 9.05 ☒ 8.49 ☒ 8.50
☒ 1439 ☒ 1346 ☒ 2110 ☒ 1417 ☒ 2164
☒ 8 ☒ 8 ☒ 4 ☒ 3 ☒ 9

These analyses, opinions or interpretations are based on observations and material supplied by the client to whom, and for whose exclusive and confidential use, this report is made. The interpretations or opinions are based on the best judgment of Core Laboratories, Inc. and its officers and employees, assume no responsibility and no warranty or representation as to the productivity, proper operations, or profitability of any oil, gas, coal or other mineral property, well or sand in connection with which such report is used or relied upon.

CORE LABORATORIES, INC. ANALYTICAL REPORT

21-OCT-81

KAMAN TEMPO

JOB NO. 6307-
SAMPLE ID:
SAMPLE REMARKS:

W81396 - 1
D-8

W81396 - 2
W-0

W81396 - 3
D-6

W81396 - 4
DIS. TO A

W81396 - 5
J.P.

W81396 - 6
DIS. FROM CB

RESULTS OF WATER QUALITY ANALYSIS ON SAMPLES COLLECTED AT LOCATION:

MAJOR CATIONS

CALCIUM (Ca)	52.0 (2.59)	✓ 37.0 (1.85)	✓ 43.0 (2.15)	✓ 7.30 (0.36)	✓ 36.0 (1.80)	6.50 (0.32)
MAGNESIUM (Mg)	98.0 (8.06)	✓ 83.0 (6.83)	✓ 57.0 (4.69)	✓ 4.40 (0.36)	✓ 83.0 (6.83)	4.60 (0.38)
SODIUM (Na)	180 (7.83)	✓ 190 (8.26)	✓ 200 (8.70)	✓ 540 (23.49)	✓ 200 (8.70)	540 (23.49)
POTASSIUM (K)	0.27 (0.01)	✓ 0.36 (0.01)	✓ 0.29 (0.01)	✓ 4.30 (0.11)	✓ 0.35 (0.01)	4.10 (0.10)
IRON (Fe)	2.09 (0.11)	✓ 0.26 (0.01)	✓ 0.09 (0.00)	✓ 0.08 (0.00)	✓ 0.06 (0.00)	0.05 (0.00)
SUM OF MAJOR CATIONS (meq)	(18.60)	(16.96)	(15.55)	(24.32)	(17.34)	(24.29)

SUM OF TOTAL CATIONS (meq)

(18.73)	(17.08)	(15.74)	(24.61)	(17.46)	(24.58)
---------	---------	---------	---------	---------	---------

MAJOR ANIONS

BICARBONATE (HCO3)	624 (10.23)	✓ 535 (8.77)	✓ 500 (8.20)	✓ 1135 (18.60)	✓ 532 (8.72)	1069 (17.52)
CARBONATE (CO3)	<1 (0.00)	✓ <1 (0.00)	✓ <1 (0.00)	✓ 10.8 (0.36)	✓ <1 (0.00)	<1 (0.00)
HYDROXIDE (OH)	<0.5 (0.00)	<0.5 (0.00)	<0.5 (0.00)	<0.5 (0.00)	<0.5 (0.00)	<0.5 (0.00)
SULFATE (SO4)	397 (8.26)	✓ 348 (7.25)	✓ 361 (7.51)	✓ 176 (3.66)	✓ 430 (8.94)	311 (6.48)
CHLORIDE (Cl)	8.12 (0.23)	✓ 9.47 (0.27)	✓ 9.36 (0.26)	✓ 8.34 (0.24)	✓ 8.34 (0.24)	8.12 (0.23)
SUM OF MAJOR ANIONS (meq)	(18.72)	(16.29)	(15.97)	(22.86)	(17.90)	(24.23)

SUM OF TOTAL ANIONS (meq)

(18.78)	(16.36)	(16.01)	(23.69)	(17.99)	(25.05)
---------	---------	---------	---------	---------	---------

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111-431

CORE LABORATORIES, INC. ANALYTICAL REPORT

21-OCT-81

KAMAN TEMPO

RESULTS OF WATER QUALITY ANALYSIS ON SAMPLES COLLECTED AT LOCATION:

JOB NO. 6307-	W81396 - 1	W81396 - 2	W81396 - 3	W81396 - 4	W81396 - 5	W81396 - 6
SAMPLE ID:	D-8	W-0	D-6	DIS. TO A	J.P.	DIS. FROM <i>FB</i>
SAMPLE REMARKS:						

GENERAL PARAMETERS

✓ TOTAL DISSOLVED SOLIDS (CALC.)	1053 (1074)	✓ 1003 (952)	✓ 953 (944)	✓ 1354 (1349)	✓ 1033 (1043)	1517 (1452)
✓ TOTAL SUSPENDED SOLIDS	4	✓ 4	✓ 4	✓ 565	✓ 4	6
✓ TOTAL VOLATILE SOLIDS	264	✓ 205	✓ 144	✓ 320	✓ 226	297
✓ TOTAL SOLIDS	1057	✓ 1007	✓ 955	✓ 1919	✓ 1036	1523
✓ TOTAL ALKALINITY (AS CaCO3)	531	✓ 469	✓ 429	✓ 1147	✓ 469	926
✓ TOTAL ACIDITY (AS CaCO3)	<5	✓ <5	✓ <5	✓ <5	✓ <5	<5
✓ NITROGEN-KJELDAHL (TOTAL)	1.5	✓ 0.7	✓ 4.7	✓ 3.1	✓ 1.1	6.9
✓ AMMONIA (NH3-N)	0.67	✓ 0.22	✓ 1.74	✓ 0.90	✓ 0.11	1.33
✓ NITRATE (NO3-N)	0.3	✓ 0.2	✓ 0.2	✓ 1.2	✓ <0.1	1.5
✓ FLUORIDE (F)	1.06	✓ 1.25	✓ 0.76	✓ 15.30	✓ 1.71	15.10
✓ *Settleable Matter	0.8	✓ <0.1	✓ <0.1	✓ 4.5	✓ <0.1	<0.1

*(ml/liter/hour)

III-432

CORE LABORATORIES, INC. ANALYTICAL REPORT

21-OCT-81

KAMAN TEMPID

RESULTS OF WATER QUALITY ANALYSIS ON SAMPLES COLLECTED AT LOCATION:

JOB NO. 6307-	W81396 - 1	W81396 - 2	W81396 - 3	W81396 - 4	W81396 - 5	W81396 - 6
SAMPLE ID:	D-8	W-0	D-6	DIS. TO A	J.P.	DIS. FROM C
SAMPLE REMARKS:						

METALS

✓ ARSENIC (As)	✓ <0.01	✓ <0.01	✓ <0.01	✓ <0.01	✓ <0.01	✓ <0.01
✓ BORON (B)	✓ 0.35	✓ 0.37	✓ 0.32	✓ 0.86	✓ 0.41	✓ 0.79
✓ MERCURY (Hg) -- (ug/L)	✓ <0.3	✓ <0.3	✓ <0.3	✓ <0.3	✓ <0.3	✓ <0.3
✓ MOLYBDENUM (Mo)	✓ <0.1	✓ <0.1	✓ <0.1	✓ <0.1	✓ <0.1	✓ <0.1
✓ SELENIUM (Se)	✓ <0.01	✓ <0.01	✓ <0.01	✓ <0.01	✓ <0.01	✓ <0.01
SILICA (SiO2)	✓ 29	✓ 20	✓ 25	✓ 23	✓ 23	35
VANADIUM (V)	✓ <0.5	✓ <0.5	✓ <0.5	✓ <0.5	✓ <0.5	✓ <0.5

III-433

CORE LABORATORIES, INC. ANALYTICAL REPORT

21-OCT-81

KAMAN TEMPO

RESULTS OF WATER QUALITY ANALYSIS ON SAMPLES COLLECTED AT LOCATION:

JOB NO. 6307-	W81396 - 7	W81396 - 8
SAMPLE ID:	DIS. TO B	W-I
SAMPLE REMARKS:		
DATE/TIME SAMPLED	09-16-81/	09-17-81/
DATE/TIME RECEIVED	09-18-81/1600	09-18-81/1600
DATE/TIME ANALYZED	09-21-81/ 900	09-21-81/ 900
CHEMIST: RIF/DRH		
LOCATION: AURORA, CO		

LAB PH @ 25 DEG. C) 8.50 8.55
 LAB COND. (UMHOS @ 25 DEG. C) 2204 1443
 DISSOLVED OXYGEN (DO) 6 7
 --ALL VALUES REPORTED ON A DISSOLVED BASIS (MG./L.) UNLESS INDICATED OTHERWISE

III-434

no warranty or responsibility and no liability shall be assumed by the company for any loss or damage to property or equipment or for any injury to persons or animals resulting from the use of the product or the use of the service.

CORE LABORATORIES, INC.
ANALYTICAL REPORT

21-OCT-81

KAMAM T E M P O

RESULTS OF WATER QUALITY ANALYSIS
ON SAMPLES COLLECTED AT LOCATION:

JOB NO. 6307-
SAMPLE ID:
SAMPLE REMARKS:

W81396 - 7
DIS. TO B

W81396 - 8
W-I

MAJOR CATIONS

CALCIUM (Ca) ✓ 5.20(0.26) ✓ 37.0 (1.85)
MAGNESIUM (Mg) 4.00(0.33) ✓ 83.0 (6.83)
SODIUM (Na) ✓ 550 (23.93) ✓ 190 (8.26)
POTASSIUM (K) 4.60(0.12) ✓ 0.36(0.01)
IRON (Fe) ✓ 0.06(0.00) ✓ 0.05(0.00)
SUM OF MAJOR CATIONS (meq) (24.64) (16.95)

SUM OF TOTAL CATIONS (meq) (24.94) (17.06)

MAJOR ANIONS

BICARBONATE (HCO3) ✓ 1113 (18.24) ✓ 531 (8.70)
CARBONATE (CO3) ✓ 1.20(0.04) ✓ 1.08(0.04)
HYDROXIDE (OH) ✓ 0.5 (0.00) ✓ 0.5 (0.00)
SULFATE (SO4) 286 (5.96) ✓ 382 (7.95)
CHLORIDE (Cl) ✓ 7.21(0.20) ✓ 9.47(0.27)
SUM OF MAJOR ANIONS (meq) (24.44) (16.96)

SUM OF TOTAL ANIONS (meq) (25.25) (17.05)

III-435

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CORE LABORATORIES, INC. ANALYTICAL REPORT

21-OCT-81

KAMAN TEMPO

RESULTS OF WATER QUALITY ANALYSIS ON SAMPLES COLLECTED AT LOCATION:

JOB NO. 6307-
SAMPLE ID:
SAMPLE REMARKS:

W81396 - 7
DIS. TO B

W81396 - 8
W-I

GENERAL PARAMETERS

TOTAL DISSOLVED SOLIDS (CALC.)	1527 (1464)	✓ 1053 (987)
TOTAL SUSPENDED SOLIDS	12	✓ <4
TOTAL VOLATILE SOLIDS	256	✓ 214
TOTAL SOLIDS	1539	✓ 1054
TOTAL ALKALINITY (AS CaCO ₃)	959	✓ 474
TOTAL ACIDITY (AS CaCO ₃)	<5	✓ <5
NITROGEN-KJELDAHL (TOTAL)	4.0	✓ 1.7
AMMONIA (NH ₃ -N)	1.75	✓ 0.10
NITRATE (NO ₃ -N)	1.7	✓ 0.1
FLUORIDE (F)	14.80	✓ 1.70
*Settleable Matter	< 0.1	✓ < 0.1

*(ml/liter/hour)

CORE LABORATORIES, INC. ANALYTICAL REPORT

21-OCT-81

KAMAN TEMPO

RESULTS OF WATER QUALITY ANALYSIS ON SAMPLES COLLECTED AT LOCATION:

JOB NO. 6307-
SAMPLE ID:
SAMPLE REMARKS:

W81396 - 7
DIS. TO B

W81396 - 8
W-I

METALS

ARSENIC (As)	<0.01	✓ <0.01
BORON (B)	0.73	✓ 0.39
MERCURY (Hg)--(ug/L)	<0.3	✓ <0.3
MOLYBDENUM (Mo)	<0.1	✓ <0.1
SELENIUM (Se)	<0.01	✓ <0.01
SILICA (SiO ₂)	41	✓ 22
VANADIUM (V)	<0.5	✓ <0.5

III-4

Analyses, opinions or interpretations are based on observations and material used represent the best judgment of Core Laboratories, Inc. (all errors and omissions are the responsibility of the user of this report and no warranty of property, well or sand in connection with which such report is used or relied upon).

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HUFFMAN LABORATORIES, INC.

3830 HIGH COURT, P.O. Box 777
Wheat Ridge, Colorado 80033
TELEPHONE: 424-3232 (AREA CODE 303)

DAN HUMMEL
CORE LABORATORIES
1300 S. POTOMAC
SUITE 130
AURORA, CO. 80012

Lab. No. 11648101

OCTOBER 15, 1981

KAMAN TEMPO

SIX FOLD DISSOLVED ORGANIC CARBON
FRACTIONATION RESULTS

Client I.D. D-8

Sample (Core Lab I.D.) 396-1

Conductivity 1300
(micromhos)

pH 7.6

Dissolved organic
carbon (ppm C) 4.7

Hydrophobics
Total (ppm C) 3.4 (71)

bases 0.0 (--)

acids 0.8 (17)

neutrals 2.5 (53)

Hydrophilics
Total (ppm C) 1.3 (29)

bases 0.2 (5)

acids 1.0 (21)

neutrals 0.1 (3)

The numbers in parentheses are the percent of the total
D.O.C. in that fraction.

This sample contained a considerable amount of particulate matter.

HUFFMAN LABORATORIES, INC.

3830 HIGH COURT, P.O. Box 777
Wheat Ridge, Colorado 80033
TELEPHONE: 424-3232 (AREA CODE 303)

DAN HUMMEL
CORE LABORATORIES
1300 S. POTOMAC
SUITE 130
AURORA, CO. 80012

Lab. No. 11648102

OCTOBER 15, 1981

KAMAN TEMPO

SIX FOLD DISSOLVED ORGANIC CARBON
FRACTIONATION RESULTS

Client I.D. W-0

Sample (Core Lab I.D.) 396-2

Conductivity 810
(micromhos)

pH 8.4

Dissolved organic
carbon (ppm C) 3.3

Hydrophobics
Total (ppm C) 1.6 (48)

bases 0.0 (--)

acids 1.1 (34)

neutrals 0.5 (15)

Hydrophilics
Total (ppm C) 1.7 (52)

bases 0.2 (7)

acids 1.4 (42)

neutrals 0.1 (3)

The numbers in parentheses are the percent of the total
D.O.C. in that fraction.

This sample contained a considerable amount of particulate matter.

III-438

HUFFMAN LABORATORIES, INC.

3830 HIGH COURT, P.O. Box 777
Wheat Ridge, Colorado 80033
TELEPHONE: 424-3232 (AREA CODE 303)

DAN HUMMEL
CORE LABORATORIES
1300 S. POTOMAC
SUITE 130
AURORA, CO. 80012

Lab. No. 11648103

OCTOBER 15, 1981

KAMAN TEMPO

SIX FOLD DISSOLVED ORGANIC CARBON
FRACTIONATION RESULTS

Client I.D. D-6

Sample (Core Lab I.D.)	396-3	
Conductivity (micromhos)	790	
pH	8.1	
Dissolved organic carbon (ppm C)	2.5	
Hydrophobics		
Total (ppm C)	1.5	(62)
bases	0.0	(--)
acids	0.6	(25)
neutrals	0.9	(35)
Hydrophilics		
Total (ppm C)	0.9	(38)
bases	0.1	(5)
acids	0.7	(30)
neutrals	0.1	(3)

The numbers in parentheses are the percent of the total
D.O.C. in that fraction.

This sample contained a considerable amount of particulate matter.

HUFFMAN LABORATORIES, INC.

3830 HIGH COURT, P.O. Box 777
Wheat Ridge, Colorado 80033
TELEPHONE: 424-3232 (AREA CODE 303)

DAN HUMMEL
CORE LABORATORIES
1300 S. POTOMIC
SUITE 130
AURORA, CO. 80012

Lab. No. 11648104

OCTOBER 15, 1981

KAMAN TEMPO

SIX FOLD DISSOLVED ORGANIC CARBON
FRACTIONATION RESULTS

Client I.D. Dis. To A

Sample (Core Lab I.D.) 396-4

Conductivity 1600
(micromhos)

pH 9.3

Dissolved organic
carbon (ppm C) 4.7

Hydrophobics

Total (ppm C) 3.9 (83)

bases 0.2 (3)

acids 0.9 (19)

neutrals 2.8 (60)

Hydrophilics

Total (ppm C) 0.8 (17)

bases 0.2 (5)

acids 0.3 (6)

neutrals 0.3 (7)

The numbers in parentheses are the percent of the total
.O.C. in that fraction.

This sample contained a considerable amount of particulate matter.

HUFFMAN LABORATORIES, INC.

3830 HIGH COURT, P.O. Box 777
Wheat Ridge, Colorado 80033
TELEPHONE: 424-3232 (AREA CODE 303)

DAN HUMMEL
CORE LABORATORIES
1300 S. POTOMAC
SUITE 130
AURORA, CO. 80012

Lab. No. 11048105

OCTOBER 15, 1981

KAMAN TEMPO

**SIX FOLD DISSOLVED ORGANIC CARBON
FRACTIONATION RESULTS**

Client I.D. J.P.

Sample (Core Lab I.D.) 306-5

Conductivity 1100
(micromhos)

pH 8.4

isolved organic
carbon (ppm C) 3.1

Hydrophobics
Total (ppm C) 1.6 (52)

bases 0.1 (3)

acids 0.9 (29)

neutrals 0.6 (20)

Hydrophilics
Total (ppm C) 1.5 (48)

bases 0.5 (15)

acids 0.4 (13)

neutrals 0.6 (20)

The numbers in parentheses are the percent of the total
.O.C. in that fraction.

Sample was diluted 1:1.607 before fractionation analysis.
Results reported are based on the diluted sample.

III-441

This sample contained a considerable amount of particulate matter.

HUFFMAN LABORATORIES, INC.

3830 HIGH COURT, P.O. Box 777
Wheat Ridge, Colorado 80033
TELEPHONE: 424-3232 (AREA CODE 303)

DAN HUMMEL
CORE LABORATORIES
1300 S. POTOMIC
SUITE 130
AURORA, CO. 80012

Lab. No. 11648106

OCTOBER 15, 1981

KAMAN TEMPO

SIX FOLD DISSOLVED ORGANIC CARBON
FRACTIONATION RESULTS

Client I.D. Dis. from C

Sample (Core Lab I.D.) 396-6

Conductivity 1500
(micromhos)

pH 8.0

Dissolved organic
carbon (ppm C) 3.6

Hydrophobics
Total (ppm C) 2.1 (59)
bases 0.3 (7)
acids 1.7 (47)
neutrals 0.2 (5)

Hydrophilics
Total (ppm C) 1.5 (41)
bases 0.1 (4)
acids 1.0 (28)
neutrals 0.3 (10)

The numbers in parentheses are the percent of the total
.O.C. in that fraction.

HUFFMAN LABORATORIES, INC.

3830 HIGH COURT, P.O. Box 777
Wheat Ridge, Colorado 80033
TELEPHONE: 424-3232 (AREA CODE 303)

DAN HUMMEL
CORE LABORATORIES
1300 S. POTOMAC
SUITE 130
AURORA, CO. 80012

Lab. No. 11642107

OCTOBER 15, 1981

KAMAN TEMPO

SIX FOLD DISSOLVED ORGANIC CARBON FRACTIONATION RESULTS

Client I.D. Dis. To B

Sample (Core Lab I.D.)	396-7	
Conductivity (micromhos)	1600	
pH	8.0	
isolved organic carbon (ppm C)	20.7	
Hydrophobics		
Total (ppm C)	3.9	(19)
bases	0.3	(1)
acids	2.2	(11)
neutrals	1.4	(7)
Hydrophilics		
Total (ppm C)	16.7	(81)
bases	0.5	(2)
acids	1.4	(7)
neutrals	14.9	(72)

The numbers in parentheses are the percent of the total
D.O.C. in that fraction.

This sample contained a considerable amount of particulate matter.

HUFFMAN LABORATORIES, INC.

3830 HIGH COURT, P.O. Box 777
Wheat Ridge, Colorado 80033
TELEPHONE: 424-3232 (AREA CODE 303)

DAN HUMMEL
CORE LABORATORIES
1300 S. PCTONIC
SUITE 130
AURORA, CO. 80012

Lab. No. 11648108

OCTOBER 15, 1981

KAMAN TEMPO

SIX FOLD DISSOLVED ORGANIC CARBON
FRACTIONATION RESULTS

Client I.D. W-I

Sample (Core Lab I.D.)	396-8	
Conductivity (micromhos)	1300	
	8.1	
Dissolved organic carbon (ppm C)	3.9	
Hydrophobics		
Total (ppm C)	1.5	(38)
bases	0.2	(4)
acids	1.1	(29)
neutrals	0.2	(5)
Hydrophilics		
Total (ppm C)	2.4	(62)
bases	0.7	(18)
acids	1.6	(41)
neutrals	0.1	(3)

The numbers in parentheses are the percent of the total
D.O.C. in that fraction.

This sample contained a considerable amount of particulate matter.

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
CENTRAL LABORATORY DENVER, COLORADO

WATER QUALITY ANALYSIS
LAB-ID # 146075 RECORD-# 47965

SAMPLE LOCATION: C-8 ALLUVIUM WELL A-1
STATION ID: 395034108135700 LAT.LONG.SEQ.: 395034 1081357 00
DATE OF COLLECTION: BEGIN--810521 END-- TIME--1345 ✓
STATE CODE: OR COUNTY CODE: 103 PROJECT IDENTIFICATION: 460806400
DATA TYPE: 2 SOURCE: GROUND WATER GEOLOGIC UNIT:
COMMENTS: UNIQUE-#:
WELL A-1; COLL BY TORIN

ALK TOT LAB. CAC03	MG/L	580	NITR DIS NO2 AS N	MG/L	0.00
ALUMINUM, DIS.	UG/L	0	NITR DIS NO3 AS N	MG/L	0.10
ANALYZING AGENCY		80020	NITR DIS NO2+NO3 -N	MG/L	0.11
ARSENIC, DISSOLVED	UG/L	1	NITR DISS NH4 AS N	MG/L	0.12
BARIUM, DIS.	UG/L	40	NITR DISS NH4+ORG-N	MG/L	0.79
BERYLLIUM, DIS.	UG/L	< 1	NITR DISS ORG AS N	MG/L	0.60
BORON, DISSOLVED	UG/L	240	NITR DISSOLVED AS N	MG/L	0.86
CADMIUM, DIS.	UG/L	< 1	NITR TOT NO2 AS N	MG/L	0.02
CALCIUM, DISSOLV.	MG/L	70	NITR. DIS NH4 AS NH4	MG/L	0.19
CARBON, ORGANIC, DIS	MG/L	5.2	PH (LABORATORY)	UNITS	8.0
CHLORIDE, DISSOLVED	MG/L	20	PH FIELD	UNITS	7.5
CHROMIUM, DIS.	UG/L	10	PHOS DIS ORTHO AS P	MG/L	0.01
COBALT, DIS.	UG/L	< 3	PHOSPHORUS, DIS.	MG/L	0.09
COPPER, DIS.	UG/L	1	POTASSIUM-40, DISS.	PCI/L	1.3
CYANIDE, TOTAL	MG/L	0.00	POTASSIUM, DISSOLVED	MG/L	1.8
FLUORIDE, DISSOLVED	MG/L	0.8	RESIDUE DIS CALC SUM	MG/L	1280
HARDNESS	MG/L	500	SELENIUM, DISSOLVED	UG/L	1
HARDNESS N.CARB L-EP	MG/L	0	SILICA, DIS.	MG/L	19
IRON, DIS.	UG/L	< 10	SODIUM, ABSORP RATIO		5.3
LEAD, DIS.	UG/L	3	SODIUM, DIS.	MG/L	270
LITHIUM, DISSOLV.	UG/L	20	SODIUM, PERCENT	%	54
MAGNESIUM, DISSOLV.	MG/L	78	SP. CONDUCTANCE FLD	UMHOS	1830 ✓
MANGANESE, DISSOLV.	UG/L	330	SP. CONDUCTANCE LAB	UMHOS	1800
MERCURY, DISSOLVED	UG/L	0.0	STRONTIUM, DIS.	UG/L	2700
METALS DISS CHE-EXT		1	SULFATE, DISSOLVED	MG/L	470
MOLYBDENUM, DISSOLV.	UG/L	11	VANADIUM, DIS.	UG/L	5
NICKEL, DIS.	UG/L	4	WATER TEMPERATURE	DEG C	10.2
			ZINC, DIS.	UG/L	20

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WATER QUALITY ANALYSIS CONTINUED
LAB ID # 146075 RECORD # 47965

SAMPLE LOCATION: C-R ALLUVIUM WELL A-1
STATION ID: 395034108135700 LAT.LONG.SEO.: 395034 1081357 00
DATE OF COLLECTION: BEGIN--810521 END-- TIME--1345

CATIONS			ANIONS		
	(MG/L)	(MEQ/L)		(MG/L)	(MEQ/L)
CALCIUM, DISSO	70	3.493	CHLORIDE, DISS	20	0.564
MAGNESTUM, DIS	78	6.416	FLUORIDE, DISS	0.8	0.042
POTASSIUM, DIS	1.8	0.046	SULFATE, DISSO	470	9.789
SODIUM, DIS.	270	11.745	ALK TOT LAB.	580	11.582
			NITR DIS NO2+N	0.11	0.004
TOTAL		<u>21.700</u>	TOTAL		<u>21.982</u>

PERCENT DIFFERENCE = -0.66

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CENTRAL LABORATORY DENVER, COLORADO

WATER QUALITY ANALYSIS
LAB-ID # 146076 RECORD-# 47968

SAMPLE LOCATION: C-R ALLUVIUM WELL A-2
STATION ID: 395012108143702 LAT.LONG.SEO.: 395012 1081437 02
DATE OF COLLECTION: BEGIN--810521 END-- TIME--1130 ✓
STATE CODE: 08 COUNTY CODE: 103 PROJECT IDENTIFICATION: 460806400
DATA TYPE: 2 SOURCE: GROUND WATER GEOLOGIC UNIT:
COMMENTS: UNIQUE-#:
WELL A-2; COLL BY TORIN

ALK TOT LAB. CAC03	MG/L	400	NITR DIS NO2 AS N	MG/L	0.01
ALUMINUM, DIS.	UG/L	0	NITR DIS NO3 AS N	MG/L	0.25
ANALYZING AGENCY		80020	NITR DIS NO2+NO3 -N	MG/L	0.26
ARSENIC, DISSOLVED	UG/L	1	NITR DISS NH4 AS N	MG/L	0.12
BARIUM, DIS.	UG/L	90	NITR DISS NH4+ORG-N	MG/L	0.46
BERYLLIUM, DIS.	UG/L	< 1	NITR DISS ORG AS N	MG/L	0.34
BORON, DISSOLVED	UG/L	80	NITR DISSOLVED AS N	MG/L	0.72
CADMIUM, DIS.	UG/L	< 1	NITR TOT NO2 AS N	MG/L	0.01
CALCIUM, DISSOLV.	MG/L	77	NITR. DIS NH4 AS NH4	MG/L	0.15
CARBON, ORGANIC, DIS	MG/L	14	PH (LABORATORY)	UNITS	7.5-
CHLORIDE, DISSOLVED	MG/L	10	PH FIELD	UNITS	7.5-
CHROMIUM, DIS.	UG/L	10	PHOS DIS ORTHO AS P	MG/L	0.02
CORALIT. DIS.	UG/L	< 3	PHOSPHORUS, DIS.	MG/L	0.05
COPPER, DIS.	UG/L	2	POTASSIUM-40, DISS.	PCI/L	1.1
CYANIDE, TOTAL	MG/L	0.00	POTASSIUM, DISSOLVED	MG/L	1.5
FLUORIDE, DISSOLVED	MG/L	0.5	RESIDUE DIS CALC SUM	MG/L	863
HARDNESS	MG/L	490	SELENIUM, DISSOLVED	UG/L	1
HARDNESS N.CARB L-EP	MG/L	89	SILICA, DIS.	MG/L	17
IRON, DIS.	UG/L	10	SODIUM, ABSORP RATIO		2.4
LEAD, DIS.	UG/L	1	SODIUM, DIS.	MG/L	120
LITHIUM, DISSOLV.	UG/L	10	SODIUM, PERCENT	%	35
MAGNESIUM, DISSOLV.	MG/L	71	SP. CONDUCTANCE FLD	UMHOS	1280 ✓
MANGANESE, DISSOLV.	UG/L	60	SP. CONDUCTANCE LAB	UMHOS	1290 ✓
MERCURY, DISSOLVED	UG/L	0.0	STRONTIUM, DIS.	UG/L	3800 -
METALS DISS CHE-EXT		1	SULFATE, DISSOLVED	MG/L	320
MOLYBDENUM, DISSOLV.	UG/L	< 10	VANADIUM, DIS.	UG/L	7
NICKEL, DIS.	UG/L	3	WATER TEMPERATURE	DEG C	7.0 -
			ZINC, DIS.	UG/L	20

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WATER QUALITY ANALYSIS CONTINUED
 LAB ID # 146076 RECORD # 47968

SAMPLE LOCATION: C-B ALLUVIUM WELL A-2
 STATION ID: 395012108143702 LAT.LONG.SEQ.: 395012 1081437 02
 DATE OF COLLECTION: BEGIN--810521 END-- TIME--1130

CATIONS

	(MG/L)	(MEQ/L)
CALCIUM, DISSO	77	3.842
MAGNESIUM, DIS	71	5.840
POTASSIUM, DIS	1.5	0.038
SODIUM, DIS.	120	5.220

TOTAL 14.941

ANIONS

	(MG/L)	(MEQ/L)
CHLORIDE, DISS	10	0.282
FLUORIDE, DISS	0.5	0.026
SULFATE, DISSO	320	6.662
ALK TOT LAB.	400	7.992
NITR DIS NO2+N	0.26	0.019

TOTAL 14.981

PERCENT DIFFERENCE = -0.13

UNITED STATES DEPARTMENT OF THE INTERIOR
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CENTRAL LABORATORY DENVER, COLORADO

WATER QUALITY ANALYSIS
LAB-ID # 147155 RECORD-# 48824

SAMPLE LOCATION: C-R ALLUVIUM WELL A-9
STATION ID: 394812108102101 LAT.LONG.SEQ.: 394812 1081021 01
DATE OF COLLECTION: BEGIN--810522 END-- TIME--1300 ✓
STATE CODE: 08 COUNTY CODE: 103 PROJECT IDENTIFICATION: 460806400
DATA TYPE: 2 SOURCE: GROUND WATER GEOLOGIC UNIT:
COMMENTS: UNIQUE-#:
WELL A-9 COL BY TOBIN

ALK TOT LAB. CAC03	MG/L	380	NITR DIS NO2 AS	N MG/L	0.0
ALUMINUM, DIS.	UG/L	0	NITR DIS NO3 AS	N MG/L	1.3
ANALYZING AGENCY		80020	NITR DIS NO2+NO3	-N MG/L	1.3
ARSENIC, DISSOLVED	UG/L	1	NITR DISS NH4 AS	N MG/L	0.1
BARIUM, DIS.	UG/L	40	NITR DISS NH4+ORG-N	MG/L	0.8
BERYLLIUM, DIS.	UG/L	< 1	NITR DISS ORG	AS N MG/L	0.7
BORON, DISSOLVED	UG/L	50	NITR DISSOLVED	AS N MG/L	2.2
CADMIUM, DIS.	UG/L	< 1	NITR. DIS NH4 AS NH4	MG/L	0.1
CALCIUM, DISSOLV.	MG/L	74	PH (LABORATORY)	UNITS	7.8
CARBON, ORGANIC, DIS	MG/L	8.3	PH FIELD	UNITS	7.7
CHLORIDE, DISSOLVED	MG/L	5.4	PHOS DIS ORTHO	AS P MG/L	0.0
CHROMIUM, DIS.	UG/L	10	PHOSPHORUS, DIS.	MG/L	0.0
COBALT, DIS.	UG/L	< 3	POTASSIUM-40, DISS.	PCI/L	0.7
COPPER, DIS.	UG/L	1	POTASSIUM, DISSOLVED	MG/L	0.9
CYANIDE, TOTAL	MG/L	0.00	RESIDUE DIS CALC SUM	MG/L	786
FLUORIDE, DISSOLVED	MG/L	0.2	SELENIUM, DISSOLVED	UG/L	1
HARDNESS	MG/L	450	SILICA, DIS.	MG/L	15
HARDNESS N.CARB L-EP	MG/L	67	SODIUM, ABSORP RATIO		2.3
IRON, DIS.	UG/L	< 10	SODIUM, DIS.	MG/L	110
LEAD, DIS.	UG/L	3	SODIUM, PERCENT	%	35
LITHIUM, DISSOLV.	UG/L	10	SP. CONDUCTANCE FLD	UMHOS	1200 ✓
MAGNESIUM, DISSOLV.	MG/L	63	SP. CONDUCTANCE LAB	UMHOS	1210 ✓
MANGANESE, DISSOLV.	UG/L	< 1	STRONTIUM, DIS.	UG/L	2800
MERCURY, DISSOLVED	UG/L	0.0	SULFATE, DISSOLVED	MG/L	280
METALS DISS CHE-EXT		1	VANADIUM, DIS.	UG/L	8
MOLYBDENUM, DISSOLV.	UG/L	< 10	WATER TEMPERATURE	DEG C	9.8
NICKEL, DIS.	UG/L	3	ZINC, DIS.	UG/L	5

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WATER QUALITY ANALYSIS CONTINUED
 LAB ID # 147155 RECORD # 48824

SAMPLE LOCATION: C-B ALLUVIUM WELL A-9

STATION ID: 394812108102101 LAT.LONG.SEQ.: 394812 1081021 01

DATE OF COLLECTION: BEGIN--810522 END-- TIME--1300

CATIONS			ANIONS		
	(MG/L)	(MEQ/L)		(MG/L)	(MEQ/L)
CALCIUM, DISSO	74	3.693	CHLORIDE, DISS	5.4	0.19
MAGNESIUM, DIS	63	5.182	FLUORIDE, DISS	0.2	0.00
POTASSIUM, DIS	0.9	0.023	SULFATE, DISSO	280	5.83
SODIUM, DIS.	110	4.785	ALK TOT LAB.	380	7.59
			NITR DIS NO2+N	1.3	0.09
TOTAL		13.683	TOTAL		13.67

PERCENT DIFFERENCE = 0.02

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
CENTRAL LABORATORY DENVER, COLORADO

WATER QUALITY ANALYSIS
LAB-ID # 147154 RECORD-# 48821

SAMPLE LOCATION: C-R ALLUVIUM WELL A-12
STATION ID: 394659108112402 LAT.LONG.SEQ.: 394659 1081124 02
DATE OF COLLECTION: BEGIN--810522 END-- TIME--1030 -
STATE CODE: 08 COUNTY CODE: 103 PROJECT IDENTIFICATION: 460806400
DATA TYPE: 2 SOURCE: GROUND WATER GEOLOGIC UNIT:
COMMENTS: UNIQUE-#:
WELL A-12 COL BY TORIN

ALK TOT LAB. CAC03	MG/L	470	NITR DIS NO2 AS N	MG/L	0.00
ALUMINUM, DIS.	UG/L	20	NITR DIS NO3 AS N	MG/L	0.47
ANALYZING AGENCY		80020	NITR DIS NO2+NO3 -N	MG/L	0.47
ARSENIC, DISSOLVED	UG/L	0	NITR DISS NH4 AS N	MG/L	0.11
BARIUM, DIS.	UG/L	50	NITR DISS NH4+ORG-N	MG/L	0.56
BERYLLIUM, DIS.	UG/L	< 1	NITR DISS ORG AS N	MG/L	0.45
BORON, DISSOLVED	UG/L	70	NITR DISSOLVED AS N	MG/L	1.0
CADMIUM, DIS.	UG/L	< 1	NITR. DIS NH4 AS NH4	MG/L	0.14
CALCIUM, DISSOLV.	MG/L	100	PH (LABORATORY)	UNITS	7.6
CARBON, ORGANIC, DIS	MG/L	7.3	PH FIELD	UNITS	7.6
CHLORIDE, DISSOLVED	MG/L	7.6	PHOS DIS ORTHO AS P	MG/L	0.02
CHROMIUM, DIS.	UG/L	0	PHOSPHORUS, DIS.	MG/L	0.04
CORALT, DIS.	UG/L	< 3	POTASSIUM-40, DISS.	PCI/L	1.3
COPPER, DIS.	UG/L	1	POTASSIUM, DISSOLVED	MG/L	1.7
CYANIDE, TOTAL	MG/L	0.00	RESIDUE DIS CALC SUM	MG/L	1080
FLUORIDE, DISSOLVED	MG/L	0.2	SELENIUM, DISSOLVED	UG/L	1
HARDNESS	MG/L	630	SILICA, DIS.	MG/L	15
HARDNESS N.CARB L-EP	MG/L	160	SODIUM, ABSORP RATIO		2.4
IRON, DIS.	UG/L	< 10	SODIUM, DIS.	MG/L	140
LEAD, DIS.	UG/L	5	SODIUM, PERCENT	%	33
LITHIUM, DISSOLV.	UG/L	20	SP. CONDUCTANCE FLD	UMHOS	1550
MAGNESIUM, DISSOLV.	MG/L	91	SP. CONDUCTANCE LAB	UMHOS	1590
MANGANESE, DISSOLV.	UG/L	3	STRONTIUM, DIS.	UG/L	3700
MERCURY, DISSOLVED	UG/L	0.0	SULFATE, DISSOLVED	MG/L	440
METALS DISS CHE-EXT		1	VANADIUM, DIS.	UG/L	7
MOLYBDENUM, DISSOLV.	UG/L	13	WATER TEMPERATURE	DEG C	8.5
NICKEL, DIS.	UG/L	4	ZINC, DIS.	UG/L	20

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WATER QUALITY ANALYSIS CONTINUED
 LAB ID # 147154 RECORD # 48821

SAMPLE LOCATION: C-R ALLUVIUM WELL A-12
 STATION ID: 394659108112402 LAT.LONG.SEQ.: 394659 1081124 02
 DATE OF COLLECTION: BEGIN--810522 END-- TIME--1030

CATIONS			ANIONS		
	(MG/L)	(MEQ/L)		(MG/L)	(MEQ/L)
CALCIUM, DISSO	100	4.990	CHLORIDE, DISS	7.6	0.21
MAGNESIUM, DIS	91	7.486	FLUORIDE, DISS	0.2	0.01
POTASSIUM, DIS	1.7	0.043	SULFATE, DISSO	440	9.16
SODIUM, DIS.	140	6.090	ALK TOT LAB.	470	9.39
			NITR DIS NO2+N	0.47	0.03
TOTAL		<hr/> 18.609	TOTAL		<hr/> 18.81
PERCENT DIFFERENCE = -0.54					

October 20, 1981

To: R. G. Badger
From: E. A. Dietz
Project Personnel: E. A. Dietz and V. Hoffman
Copies To: Carole Stover (Oxy Oil Shale), A. Weston, TIC (2)
Reference: Notebook 5180 - 71-72,77,79,91,92
Subject: RESULTS FROM POLYNUCLEAR AROMATIC HYDROCARBON ANALYSES FOR
WELL WATER SAMPLES FROM CB TRACT

INTRODUCTION:

Forty one-quart water samples, which were submitted by Oxy Oil Shale have been examined for the sixteen polynuclear aromatic hydrocarbons listed by EPA as priority pollutants (see Fed. Reg. 12/3/79 Method 610). Results for these analyses are presented on the attached sheets.

Descriptions of sample handling, preparation, analyses, and quality assurance follow.

SAMPLE HISTORY:

Two batches of samples were received; the first batch of 24 samples arrived at Grand Island on 7-30-81, a second batch of 16 samples arrived on 8-7-81. Each sample was immediately logged into our custody system then placed under refrigerated storage until needed for analytical workup. Extraction and concentration protocols were carried out within one week from receipt of samples. During the period between sample workup and analyses, extracts were maintained under refrigerated storage.

Unused portions of sample extracts presently are being stored under refrigeration but will be discarded in 60 days unless a specific request to the contrary is made.

The attached result sheets specify sample history data.

SAMPLE PREPARATION:

Extraction and concentration of each water sample followed the basic protocol provided by EPA method 610 (Fed. Reg. 12/3/79). Briefly, the samples were taken from storage where solids had settled out. About 900 ml of clear water was decanted from each sample, the pH checked to be sure it was in the 5-10 range (all samples met this requirement), then extracted three times with 60 ml portions of methylene chloride. The combined methylene chloride extract was dried with Na_2SO_4 then concentrated to 10 ml using a Kuderna-Danish distillation flask equipped with a 3-ball Synder column. Each concentrate was transferred to a screw cap vial then stored in a refrigerator until gas chromatographic analysis.

ANALYSES:

Instrumentation - Gas chromatography was carried out using a Hewlett-Packard 5840A system which was equipped with a flame ionization detector, an 18835B capillary inlet system and a 7672A automatic sampler.

GC Column - A J and W 30 meter by 0.25 mm i.d. fused silica column coated with SE-54 was used.

Operating Parameters -

Column Temp. - 60° for 4 min., then to 310° at 5°/min.; held at 310° for 30 min.
Injection Temp. - 260°
Detector Temp. - 350°
Carrier Gas - Helium at 22 psig
Makeup Gas - Nitrogen at 30 cc/min.
Septum Purge - Off
Injection Purge Split - 60 cc/min.
Injection Purge Delay - 3 min.
Sample Size - Autosampler stop number 2 (~3µl), splitless mode
Recorder Attenuation - 2+2

REAGENTS:

Methylene Chloride was Burdick and Jackson Distilled-in-glass.

Water was obtained from a Millipore Milli-Q water purification system then pre-extracted with methylene chloride before use.

Polynuclear Aromatic Hydrocarbons were purchased from Supelco as a mixture of the 16 components (Cat. No. 4-8743). This mixture was used for the quantification of sample extracts. Individual solutions of each PNA were obtained from Chem Service. These standards were utilized to establish GC elution times and for preparing "spiked" water samples.

GC INTERPRETATION AND CALCULATION PROTOCOL:

Each sample chromatogram was examined for responses at or near (± 0.05 min) the retention times exhibited by the 16 PNA's. For those matched responses, the integrated peak areas or peak heights of standards were compared with sample peak areas or heights thus yielding a PNA concentration based on the following formula:

$$\text{Conc. Water Sample } (\mu\text{g/L}) = \frac{\text{Sample Peak Response}}{\text{Standard Peak Response}} \times \text{Conc. Std. Peak } (\mu\text{g/L}) \times \frac{\text{Vol. of extract}}{\text{Vol. Sample Extracted}}$$

For sample traces with minimal baseline chatter, area responses were considered appropriate, however, traces exhibiting clusters of merged peaks and baseline chatter were examined by peak height comparisons.

QUALITY ASSURANCE:

Since these samples were collected and sent to us prior to establishment of a QA protocol, no replicate samples were available for fortification tests or for examining duplicate samples. For internal QA, therefore, a program involving four PNA recovery tests and four method blanks (analyses of high-purity water with no PNA's added) was rapidly set up. Recovery test results are presented in Table I. Of the four method blanks, two were free of peaks at retention times of the 16 PNA's (2 times noise), one showed a peak at the established retention time of pyrene but at a level below 1ppb, and the fourth had 2 peaks which corresponded to retention times for benzo(b)fluoranthene and benzo(k)-fluoranthene, however, each were at levels below 10ppb.

To help assure the quality of reported results, standard curves, method blanks, solvent blanks, and recovery test samples were interspersed among "real" samples.

DISCUSSION:

EPA method 610 for PNA determinations provides that either HPLC or packed column GC methods be used for compound detection and quantification. We chose the GC method but employed state-of-the-art capillary column/splitless injection techniques. By so doing, the PNA elution time overlaps were eliminated and our detection limits were lower than possible using packed columns. In addition, the need for sample cleanup methods given in method 610 did not have to be implemented due to the high chromatographic resolution achieved using capillary columns.

Figure 1 presents a chromatographic trace obtained for a standard injection of the 16 PNA's. As seen, each PNA is resolved and exhibits a unique response. Table II presents typical GC calibration results for the 16 PNA's using our methodology; review of these data confirms the reliability of the splitless capillary mode of operation and demonstrates detector linearity.

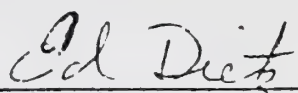
Three types of GC traces were noted in reviewing the data from the forty samples. They are exemplified by figures 2-4. A type I trace (figure 2) is similar to what we obtained for a method blank i.e., purified water samples. The four large responses near the end of the GC trace are related to the method blank background and thus not associated with the sample. Figure 3 shows a type II chromatogram. It contains the 4 method background peaks but also has sample related responses. Figure 4 (type III sample) is similar to figure 3 except that more peaks are evident and more intense responses are noted.

In evaluating the GC traces obtained for the forty samples, a cutoff of 20ppb ($\mu\text{g/L}$) for a reporting detection limit was set. Although the analytical technique can detect lower levels, interferences and reduced responses for the late eluting PNA's led us to set 20ppb as a level. To demonstrate this selection, figures 5-7 are presented. Figure 5 is a chromatogram of a type III sample; the annotation printout of retention times has been deleted to facilitate examination of the sample profile. Figure 6 represents a trace for a mixed standard which contains acenaphthylene, fluorene, benzo(b)fluoranthene, and indeno(1,2,3,-c,d)pyrene, each at a concentration representing 20 $\mu\text{g/L}$ in a water sample. Clearly, the four responses are easily found. However, the relative responses are reduced as the respective PNA retention times increase. Figure 7 shows a chromatogram for the sample shown in figure 5 except it has been fortified with 20 $\mu\text{g/L}$ equivalent of the above listed PNA's. These four responses are easily picked out and demonstrate that a method detection limit of 20 $\mu\text{g/L}$ is valid. To reduce the detection limit below 20 $\mu\text{g/L}$ would be questionable since sufficient quality assurance has not been worked into the analysis method and the mass of merged peaks in the type III chromatograms makes quantitation very subjective (i.e., how to decide peak area or height allocation).

The only PNA observed above 20 $\mu\text{g/L}$ in the forty samples was naphthalene. Sample BWD14-1-1205-1-31 had 300 $\mu\text{g/L}$. To help confirm the identity of this peak, an extract fortification test was conducted. For this, a slightly diluted extract of the sample was chromatographed and the naphthalene concentration quantified at 260 $\mu\text{g/L}$. To the extract was added naphthalene equivalent to 75 $\mu\text{g/L}$ then a chromatogram of this solution was examined. The naphthalene response in this case quantitated at 330 $\mu\text{g/L}$. Thus a 93% recovery of the spike was achieved. This is strong evidence that naphthalene is present in sample BWD14-1-1205-1-31.

CONCLUSIONS AND RECOMMENDATIONS:

Although there was limited quality assurance testing, we feel our results are very reliable and are easily supported. Future work using the described method is highly recommended. For achieving lower detection limits and providing increased quality assurance data, we suggest that more planning be made prior to sampling. In this way the analytical constraints associated with the analyses can be appropriately addressed prior to attempting actual testing as was done with the samples reported here.



E. A. Dietz
Senior Research Chemist
Central Sciences

EAD:sf
A0147
Attachments

TABLE I
Results of PNA Recovery Tests

<u>Compound Added</u>	<u>Amount Added (μg/L)</u>	<u>% Recovery</u>
Test (1)		
Acenaphthene	50	100
Fluoranthene	50	120
Chrysene	50	120
Benzo(a)pyrene	50	20
Test (2)		
Fluorene	50	110
Anthracene	50	70
Benzo(a)anthracene	50	110
Benzo(b)fluoranthene	50	155
Test (3)		
Phenanthrene	50	90
Benzo(k)fluoranthene	50	135
Indeno(1,2,3-c,d)pyrene	50	150
Benzo(g,h,i)perylene	50	135
Test (4)		
Naphthalene	50	100
Acenaphthylene	50	55
Pyrene	50	100
Dibenzo(a,b)anthracene	50	105

TABLE II

Gas Chromatographic Calibration Data for 16 PNA'sPeak Area Response at Five Concentration Levels (a)

<u>Compound</u>	<u>X</u>	<u>2X</u>	<u>3X</u>	<u>4X</u>	<u>10X</u>
Naphthalene	7356	14080	23960	33730	79040
Acenaphthylene	13630	26090	45190	63480	150300
Acenaphthene	7412	14150	24520	34490	77240
Fluorene	1190	2381	4211	5986	13640
Phenanthrene	658	1310	2273	3201	6896
Anthracene	567	1176	2040	2921	6245
Fluoranthene	1089	2245	3947	5491	12570
Pyrene	648	1189	2036	2742	6027
Chrysene	418	870	1631	2195	5089
Benzo(b)fluoranthene	430	911	1735	2346	5352
Benzo(k)fluoranthene	744	1575	2870	3810	8596
Benzo(a)pyrene	358	764	1406	1859	4163
Indeno(1,2,3-c,d)pyrene	273	621	1182	1559	3714
Dibenzo(a,h)anthracene	325	767	1404	1820	2108
Benzo(g,h,i)perylene	355	797	1415	1825	3684

a) Concentration X for the components are respectively:

5,10,5,1,0.5,0.5,1,0.5,0.5,0.5,1,0.5,0.5,0.5,1, and 1 µg/ml

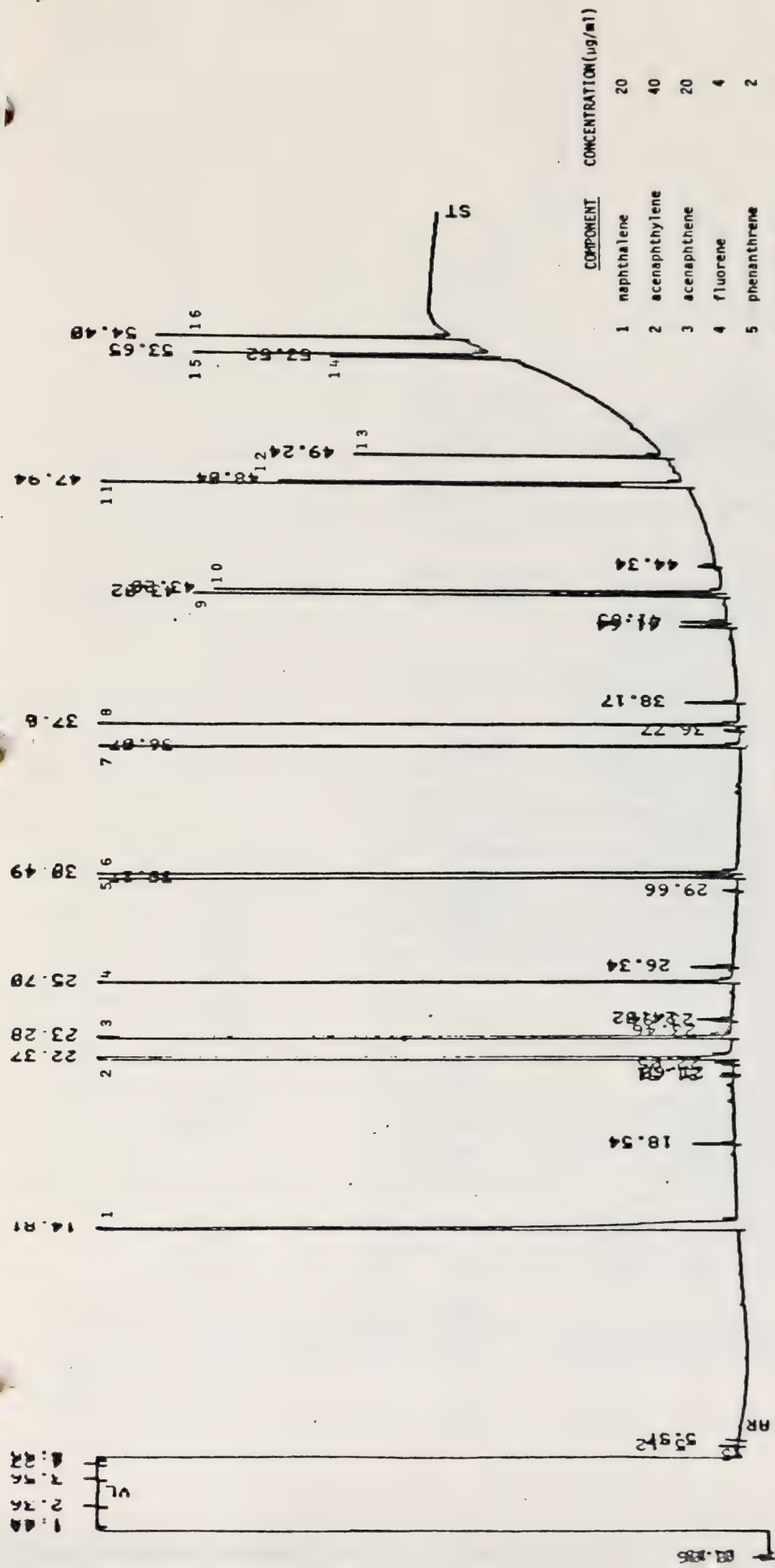


FIGURE 1.
GAS CHROMATOGRAPHIC TRACE FOR STANDARD
MIXTURE OF 16 POLYNUCLEAR AROMATIC HYDROCARBONS

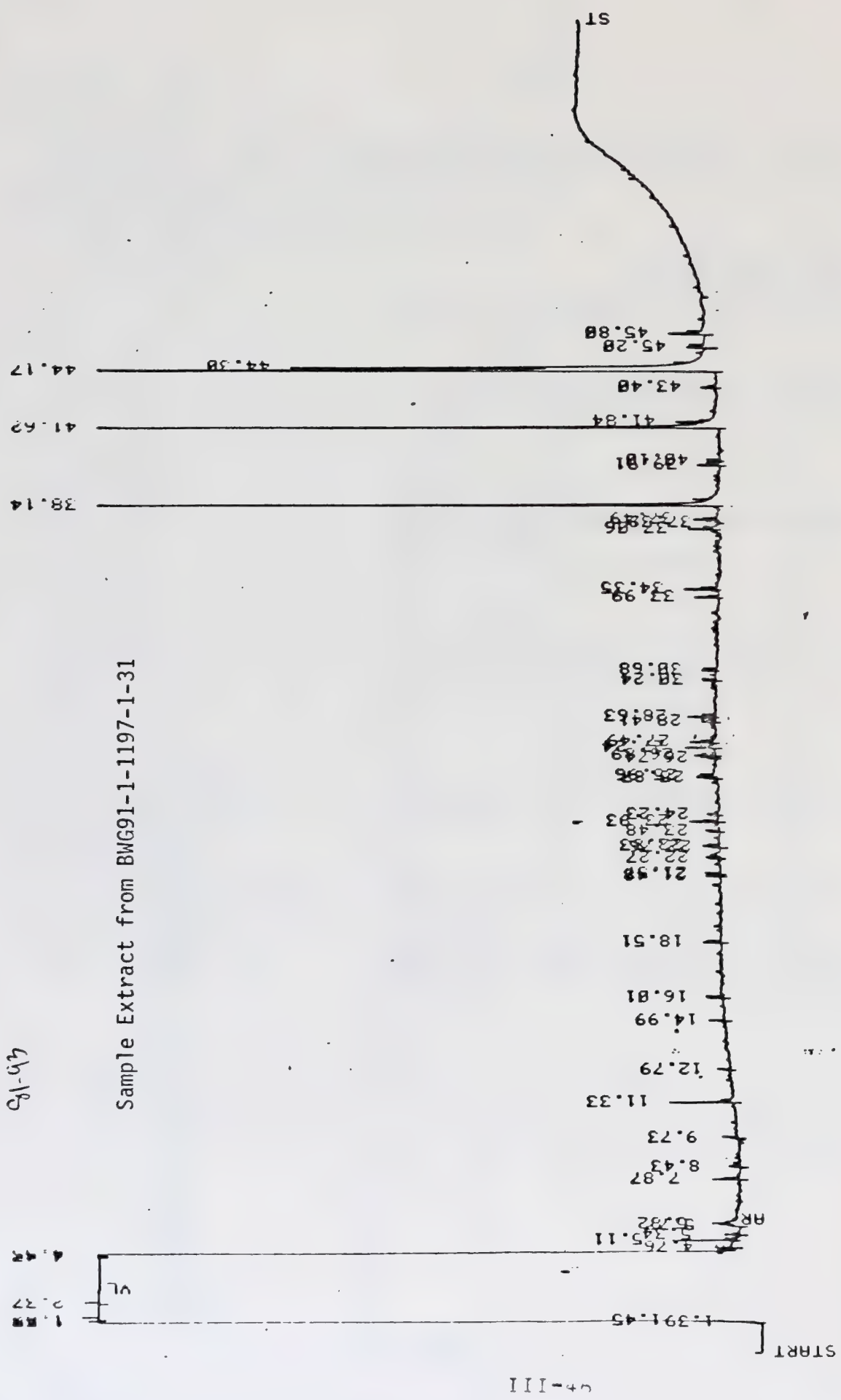


FIGURE 2.
GAS CHROMATOGRAM OF A TYPE I WATER SAMPLE

81-103

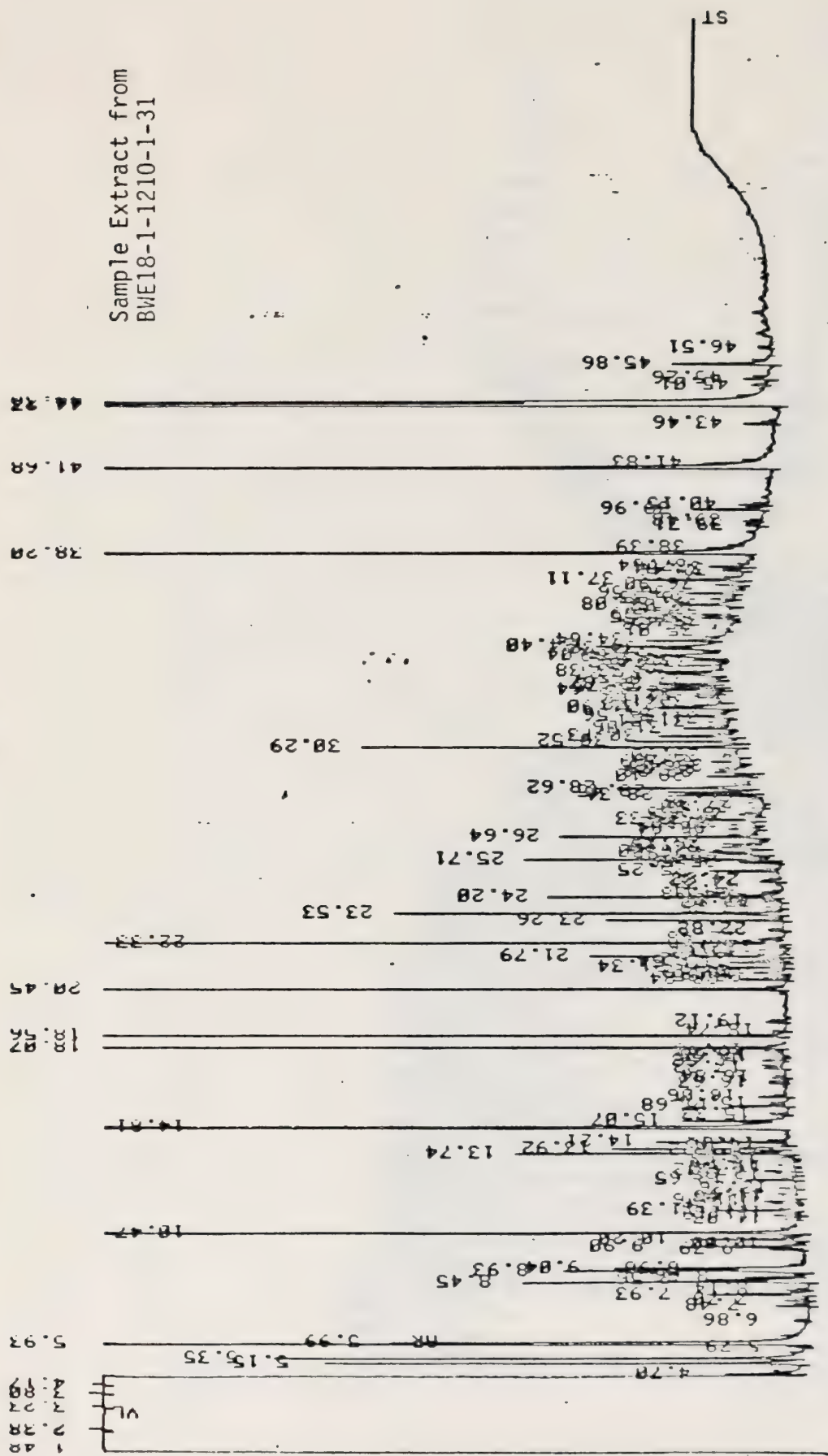


FIGURE 3.
GAS CHROMATOGRAM OF TYPE II WATER SAMPLE

UNIT START

1.48
2.36
2.25
5.72
5.55
8.14
8.88
9.88
9.82
10.18
10.68
11.31
11.74
12.48
12.69
12.83
13.41
13.98
14.11
14.78
17.21
18.04
18.53
21.51
21.12
21.68
22.03
22.45
23.23
23.58
25.99
26.52
27.22
28.61
29.79
30.23
30.51
31.29
31.77
32.44
33.18
33.77
34.18
35.68
36.31
36.59
36.88
37.6

FIGURE 4.
GAS CHROMATOGRAM OF TYPE III WATER SAMPLE

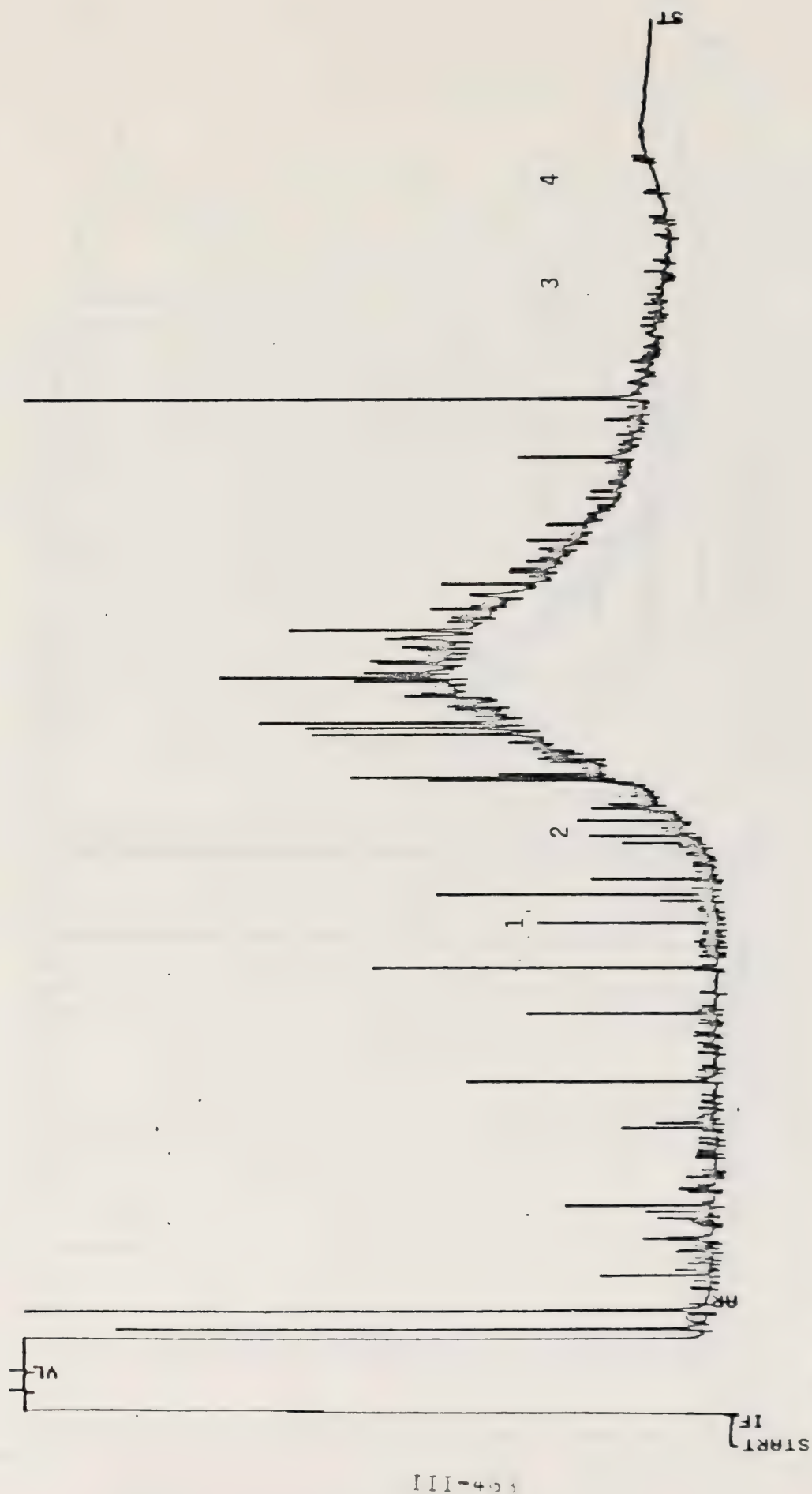


FIGURE 5.

GAS CHROMATOGRAM OF SAMPLE BWD10-1-1208-1-31

1,2,3,4 represent elution points for Acenaphthylene, Fluorene, Benzo(b)fluoranthene, and Indeno(1,2,3-c,d)pyrene.

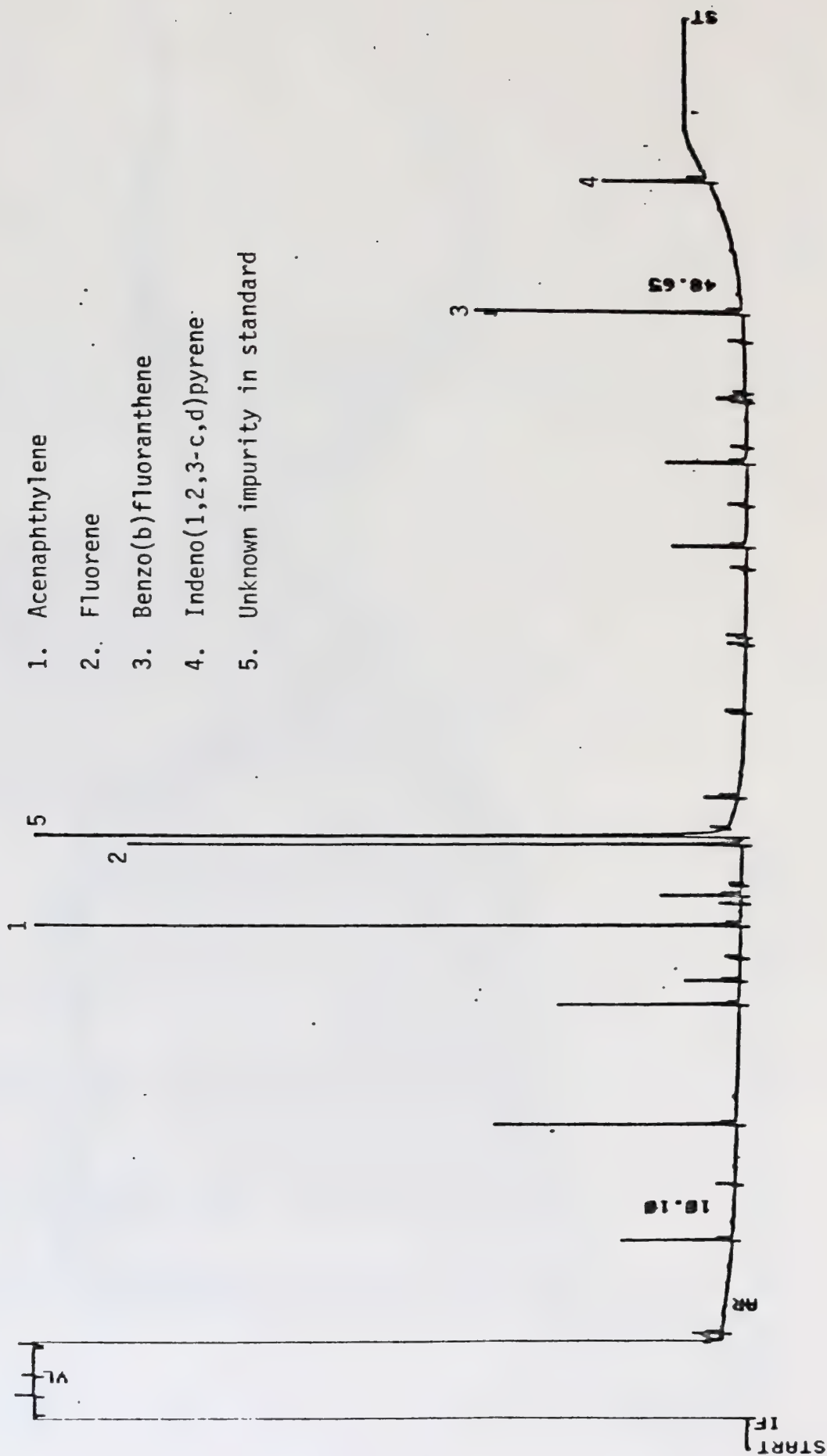


FIGURE 6.
GAS CHROMATOGRAM OF STANDARD PNA SOLUTION CONTAINING COMPONENT CONCENTRATIONS
EQUIVALENT TO 20 μ g/L (20ppb) IN A WATER SAMPLE

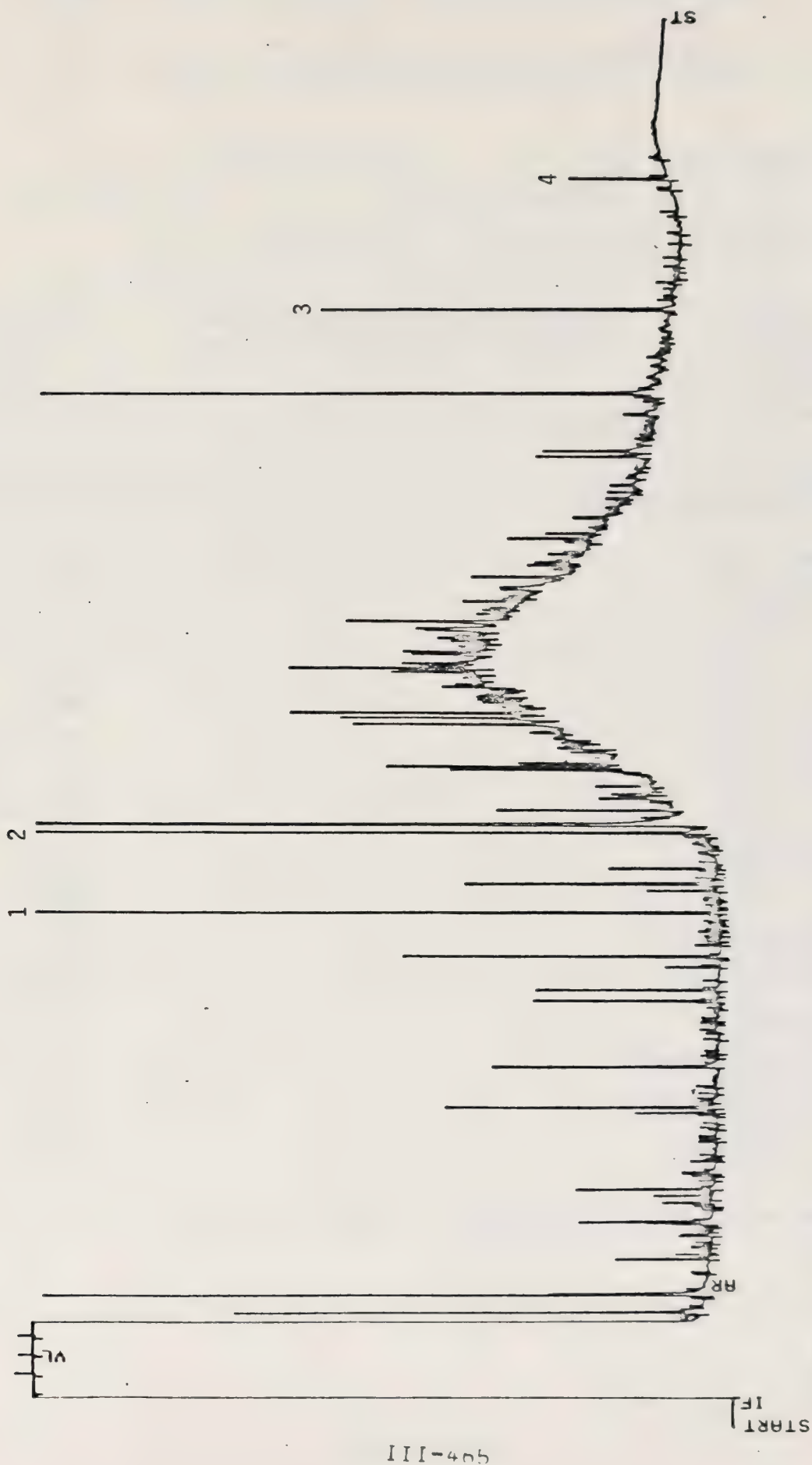


FIGURE 7.
 GAS CHROMATOGRAM OF SAMPLE BWD10-1-1208-1-31 FORTIFIED WITH
 20 μ g/L (20ppb) equivalent of 1. Acenaphthylene, 2. Fluorene, 3. Benzo(b)fluoranthene,
 and 4. Indeno(1,2,3-c,d)pyrene

RESULTS^a FROM FID/CAPILLARY GC ANALYSES OF WATER SAMPLES

FOR POLYNUCLEAR AROMATIC HYDROCARBONS : OXY OIL SHALE

FIELD SAMPLE NO.: BWD11-1-1196-1-31CENTRAL SCIENCES LOG NO.: 08-05-81-71

Sample Received	Sample Extraction/Concentration	Extract Analysis
<u>7-30-81</u>	<u>8-5-81</u>	<u>9-25-81</u>

<u>Compound^b</u>	<u>Concentration $\mu\text{g/L}$ (ppb)</u>
Naphthalene	70ppb
Acenaphthylene	ND ₂₀
Acenaphthene	ND ₂₀
Fluorene	ND ₂₀
Phenanthrene	ND ₂₀
Anthracene	ND ₂₀
Fluoranthene	ND ₂₀
Pyrene	ND ₂₀
Benzo(a)Anthracene	ND ₂₀
Chrysene	ND ₂₀
Benzo(b)Fluoranthene	ND ₂₀
Benzo(k)Fluoranthene	ND ₂₀
Benzo(a)Pyrene	ND ₂₀
Indeno(1,2,3-cd)Pyrene	ND ₂₀
Dibenzo(a,h)Anthracene	ND ₂₀
Benzo(g,h,i)Perylene	ND ₂₀

^a ND₂₀ means not detected above a level of 20 $\mu\text{g/L}$ (ppb)^b Listed in ordering of GC elution time

RESULTS^a FROM FID/CAPILLARY GC ANALYSES OF WATER SAMPLES

FOR POLYNUCLEAR AROMATIC HYDROCARBONS : OXY OIL SHALE

FIELD SAMPLE NO.: BWG52-1-1202-1-31CENTRAL SCIENCES LOG NO.: 08-05-81-72

Sample Received	Sample Extraction/Concentration	Extract Analysis
<u>7-30-81</u>	<u>8-5-81</u>	<u>9-26-81</u>

<u>Compound</u> ^b	<u>Concentration $\mu\text{g/L}$ (ppb)</u>
Naphthalene	ND ₂₀
Acenaphthylene	ND ₂₀
Acenaphthene	ND ₂₀
Fluorene	ND ₂₀
Phenanthrene	ND ₂₀
Anthracene	ND ₂₀
Fluoranthene	ND ₂₀
Pyrene	ND ₂₀
Benzo(a)Anthracene	ND ₂₀
Chrysene	ND ₂₀
Benzo(b)Fluoranthene	ND ₂₀
Benzo(k)Fluoranthene	ND ₂₀
Benzo(a)Pyrene	ND ₂₀
Indeno(1,2,3-cd)Pyrene	ND ₂₀
Dibenzo(a,h)Anthracene	ND ₂₀
Benzo(g,h,i)Perylene	ND ₂₀

^a ND₂₀ means not detected above a level of 20 $\mu\text{g/L}$ (ppb)

^b Listed in ordering of GC elution time

RESULTS^a FROM FID/CAPILLARY GC ANALYSES OF WATER SAMPLES

FOR POLYNUCLEAR AROMATIC HYDROCARBONS : OXY OIL SHALE

FIELD SAMPLE NO.: BWX38-1-1203-1-31CENTRAL SCIENCES LOG NO.: 08-05-81-73

Sample Received	Sample Extraction/Concentration	Extract Analysis
<u>7-30-81</u>	<u>8-5-81</u>	<u>9-26-81</u>

<u>Compound^b</u>	<u>Concentration $\mu\text{g/L}$ (ppb)</u>
Naphthalene	ND ₂₀
Acenaphthylene	ND ₂₀
Acenaphthene	ND ₂₀
Fluorene	ND ₂₀
Phenanthrene	ND ₂₀
Anthracene	ND ₂₀
Fluoranthene	ND ₂₀
Pyrene	ND ₂₀
Benzo(a)Anthracene	ND ₂₀
Chrysene	ND ₂₀
Benzo(b)Fluoranthene	ND ₂₀
Benzo(k)Fluoranthene	ND ₂₀
Benzo(a)Pyrene	ND ₂₀
Indeno(1,2,3-cd)Pyrene	ND ₂₀
Dibenzo(a,h)Anthracene	ND ₂₀
Benzo(g,h,i)Perylene	ND ₂₀

^a ND₂₀ means not detected above a level of 20 $\mu\text{g/L}$ (ppb)

^b Listed in ordering of GC elution time

RESULTS^a FROM FID/CAPILLARY GC ANALYSES OF WATER SAMPLES
 FOR POLYNUCLEAR AROMATIC HYDROCARBONS : OXY OIL SHALE

FIELD SAMPLE NO.: BWE21-1-1197-1-31

CENTRAL SCIENCES LOG NO.: 08-05-81-74

Sample Received	Sample Extraction/Concentration	Extract Analysis
<u>7-30-81</u>	<u>8-5-81</u>	<u>9-26-81</u>

<u>Compound^b</u>	<u>Concentration $\mu\text{g/L}$ (ppb)</u>
Naphthalene	ND ₂₀
Acenaphthylene	ND ₂₀
Acenaphthene	ND ₂₀
Fluorene	ND ₂₀
Phenanthrene	ND ₂₀
Anthracene	ND ₂₀
Fluoranthene	ND ₂₀
Pyrene	ND ₂₀
Benzo(a)Anthracene	ND ₂₀
Chrysene	ND ₂₀
Benzo(b)Fluoranthene	ND ₂₀
Benzo(k)Fluoranthene	ND ₂₀
Benzo(a)Pyrene	ND ₂₀
Indeno(1,2,3-cd)Pyrene	ND ₂₀
Dibenzo(a,h)Anthracene	ND ₂₀
Benzo(g,h,i)Perylene	ND ₂₀

^a ND₂₀ means not detected above a level of 20 $\mu\text{g/L}$ (ppb)

^b Listed in ordering of GC elution time

RESULTS^a FROM FID/CAPILLARY GC ANALYSES OF WATER SAMPLES
FOR POLYNUCLEAR AROMATIC HYDROCARBONS : OXY OIL SHALE

FIELD SAMPLE NO.: BWD02-1-1202-1-31

CENTRAL SCIENCES LOG NO.: 08-05-81-75

Sample Received	Sample Extraction/Concentration	Extract Analysis
<u>7-30-81</u>	<u>8-5-81</u>	<u>9-26-81</u>

<u>Compound^b</u>	<u>Concentration $\mu\text{g/L}$ (ppb)</u>
Naphthalene	ND ₂₀
Acenaphthylene	ND ₂₀
Acenaphthene	ND ₂₀
Fluorene	ND ₂₀
Phenanthrene	ND ₂₀
Anthracene	ND ₂₀
Fluoranthene	ND ₂₀
Pyrene	ND ₂₀
Benzo(a)Anthracene	ND ₂₀
Chrysene	ND ₂₀
Benzo(b)Fluoranthene	ND ₂₀
Benzo(k)Fluoranthene	ND ₂₀
Benzo(a)Pyrene	ND ₂₀
Indeno(1,2,3-cd)Pyrene	ND ₂₀
Dibenzo(a,h)Anthracene	ND ₂₀
Benzo(g,h,i)Perylene	ND ₂₀

^a ND₂₀ means not detected above a level of 20 $\mu\text{g/L}$ (ppb)

^b Listed in ordering of GC elution time

RESULTS^a FROM FID/CAPILLARY GC ANALYSES OF WATER SAMPLES

FOR POLYNUCLEAR AROMATIC HYDROCARBONS : OXY OIL SHALE

FIELD SAMPLE NO.: BWG61-1-1201-1-31CENTRAL SCIENCES LOG NO.: 08-05-81-76

Sample Received	Sample Extraction/Concentration	Extract Analysis
<u>7-30-81</u>	<u>8-5-81</u>	<u>9-26-81</u>

<u>Compound</u> ^b	<u>Concentration $\mu\text{g/L}$ (ppb)</u>
Naphthalene	ND ₂₀
Acenaphthylene	ND ₂₀
Acenaphthene	ND ₂₀
Fluorene	ND ₂₀
Phenanthrene	ND ₂₀
Anthracene	ND ₂₀
Fluoranthene	ND ₂₀
Pyrene	ND ₂₀
Benzo(a)Anthracene	ND ₂₀
Chrysene	ND ₂₀
Benzo(b)Fluoranthene	ND ₂₀
Benzo(k)Fluoranthene	ND ₂₀
Benzo(a)Pyrene	ND ₂₀
Indeno(1,2,3-cd)Pyrene	ND ₂₀
Dibenzo(a,h)Anthracene	ND ₂₀
Benzo(g,h,i)Perylene	ND ₂₀

^a ND₂₀ means not detected above a level of 20 $\mu\text{g/L}$ (ppb)

^b Listed in ordering of GC elution time

RESULTS^a FROM FID/CAPILLARY GC ANALYSES OF WATER SAMPLES

FOR POLYNUCLEAR AROMATIC HYDROCARBONS : OXY OIL SHALE

FIELD SAMPLE NO.: BWE04-1-1202-1-31CENTRAL SCIENCES LOG NO.: 08-05-81-77

Sample Received	Sample Extraction/Concentration	Extract Analysis
<u>7-30-81</u>	<u>8-5-81</u>	<u>9-26-81</u>

<u>Compound^b</u>	<u>Concentration $\mu\text{g/L}$ (ppb)</u>
Naphthalene	ND ₂₀
Acenaphthylene	ND ₂₀
Acenaphthene	ND ₂₀
Fluorene	ND ₂₀
Phenanthrene	ND ₂₀
Anthracene	ND ₂₀
Fluoranthene	ND ₂₀
Pyrene	ND ₂₀
Benzo(a)Anthracene	ND ₂₀
Chrysene	ND ₂₀
Benzo(b)Fluoranthene	ND ₂₀
Benzo(k)Fluoranthene	ND ₂₀
Benzo(a)Pyrene	ND ₂₀
Indeno(1,2,3-cd)Pyrene	ND ₂₀
Dibenzo(a,h)Anthracene	ND ₂₀
Benzo(g,h,i)Perylene	ND ₂₀

^a ND₂₀ means not detected above a level of 20 $\mu\text{g/L}$ (ppb)

^b Listed in ordering of GC elution time

RESULTS^a FROM FID/CAPILLARY GC ANALYSES OF WATER SAMPLES

FOR POLYNUCLEAR AROMATIC HYDROCARBONS : OXY OIL SHALE

FIELD SAMPLE NO.: BWC91-1-1197-1-31CENTRAL SCIENCES LOG NO.: 08-05-81-78

Sample Received	Sample Extraction/Concentration	Extract Analysis
<u>7-30-81</u>	<u>8-5-81</u>	<u>9-26-81</u>

<u>Compound^b</u>	<u>Concentration $\mu\text{g/L}$ (ppb)</u>
Naphthalene	ND ₂₀
Acenaphthylene	ND ₂₀
Acenaphthene	ND ₂₀
Fluorene	ND ₂₀
Phenanthrene	ND ₂₀
Anthracene	ND ₂₀
Fluoranthene	ND ₂₀
Pyrene	ND ₂₀
Benzo(a)Anthracene	ND ₂₀
Chrysene	ND ₂₀
Benzo(b)Fluoranthene	ND ₂₀
Benzo(k)Fluoranthene	ND ₂₀
Benzo(a)Pyrene	ND ₂₀
Indeno(1,2,3-cd)Pyrene	ND ₂₀
Dibenzo(a,h)Anthracene	ND ₂₀
Benzo(g,h,i)Perylene	ND ₂₀

^a ND₂₀ means not detected above a level of 20 $\mu\text{g/L}$ (ppb)

^b Listed in ordering of GC elution time

RESULTS^a FROM FID/CAPILLARY GC ANALYSES OF WATER SAMPLES

FOR POLYNUCLEAR AROMATIC HYDROCARBONS : OXY OIL SHALE

FIELD SAMPLE NO.: BWG21-1-1197-1-31CENTRAL SCIENCES LOG NO.: 08-05-81-79

Sample Received	Sample Extraction/Concentration	Extract Analysis
<u>7-30-81</u>	<u>8-5-81</u>	<u>9-26-81</u>

<u>Compound</u> ^b	<u>Concentration $\mu\text{g/L}$ (ppb)</u>
Naphthalene	ND ₂₀
Acenaphthylene	ND ₂₀
Acenaphthene	ND ₂₀
Fluorene	ND ₂₀
Phenanthrene	ND ₂₀
Anthracene	ND ₂₀
Fluoranthene	ND ₂₀
Pyrene	ND ₂₀
Benzo(a)Anthracene	ND ₂₀
Chrysene	ND ₂₀
Benzo(b)Fluoranthene	ND ₂₀
Benzo(k)Fluoranthene	ND ₂₀
Benzo(a)Pyrene	ND ₂₀
Indeno(1,2,3-cd)Pyrene	ND ₂₀
Dibenzo(a,h)Anthracene	ND ₂₀
Benzo(g,h,i)Perylene	ND ₂₀

^a ND₂₀ means not detected above a level of 20 $\mu\text{g/L}$ (ppb)^b Listed in ordering of GC elution time

RESULTS^a FROM FID/CAPILLARY GC ANALYSES OF WATER SAMPLES

FOR POLYNUCLEAR AROMATIC HYDROCARBONS : OXY OIL SHALE

FIELD SAMPLE NO.: BWE61-1-1201-1-31CENTRAL SCIENCES LOG NO.: 08-05-81-80

Sample Received	Sample Extraction/Concentration	Extract Analysis
<u>7-30-81</u>	<u>8-5-81</u>	<u>9-26-81</u>

<u>Compound^b</u>	<u>Concentration $\mu\text{g/L}$ (ppb)</u>
Naphthalene	ND ₂₀
Acenaphthylene	ND ₂₀
Acenaphthene	ND ₂₀
Fluorene	ND ₂₀
Phenanthrene	ND ₂₀
Anthracene	ND ₂₀
Fluoranthene	ND ₂₀
Pyrene	ND ₂₀
Benzo(a)Anthracene	ND ₂₀
Chrysene	ND ₂₀
Benzo(b)Fluoranthene	ND ₂₀
Benzo(k)Fluoranthene	ND ₂₀
Benzo(a)Pyrene	ND ₂₀
Indeno(1,2,3-cd)Pyrene	ND ₂₀
Dibenzo(a,h)Anthracene	ND ₂₀
Benzo(g,h,i)Perylene	ND ₂₀

^a ND₂₀ means not detected above a level of 20 $\mu\text{g/L}$ (ppb)

^b Listed in ordering of GC elution time

RESULTS^a FROM FID/CAPILLARY GC ANALYSES OF WATER SAMPLES

FOR POLYNUCLEAR AROMATIC HYDROCARBONS : OXY OIL SHALE

FIELD SAMPLE NO.: BWX44-1-1204-1-31CENTRAL SCIENCES LOG NO.: 08-05-81-81

Sample Received	Sample Extraction/Concentration	Extract Analysis
<u>7-30-81</u>	<u>-----</u>	<u>-----</u>

<u>Compound^b</u>	<u>Concentration $\mu\text{g/L}$ (ppb)</u>
Naphthalene	
Acenaphthylene	
Acenaphthene	
Fluorene	
Phenanthrene	<u>SAMPLE LOST</u>
Anthracene	
Fluoranthene	Kuderna-Danish concentrator
Pyrene	broke during evaporation.
Benzo(a)Anthracene	
Chrysene	
Benzo(b)Fluoranthene	
Benzo(k)Fluoranthene	
Benzo(a)Pyrene	
Indeno(1,2,3-cd)Pyrene	
Dibenzo(a,h)Anthracene	
Benzo(g,h,i)Perylene	

^a ND₂₀ means not detected above a level of 20 $\mu\text{g/L}$ (ppb)^b Listed in ordering of GC elution time

RESULTS^a FROM FID/CAPILLARY GC ANALYSES OF WATER SAMPLES

FOR POLYNUCLEAR AROMATIC HYDROCARBONS : OXY OIL SHALE

FIELD SAMPLE NO.: BWH21-1-1197-1-31CENTRAL SCIENCES LOG NO.: 08-05-81-82

Sample Received	Sample Extraction/Concentration	Extract Analysis
<u>7-30-81</u>	<u>8-5-81</u>	<u>9-28-81</u>

<u>Compound^b</u>	<u>Concentration $\mu\text{g/L}$ (ppb)</u>
Naphthalene	ND ₂₀
Acenaphthylene	ND ₂₀
Acenaphthene	ND ₂₀
Fluorene	ND ₂₀
Phenanthrene	ND ₂₀
Anthracene	ND ₂₀
Fluoranthene	ND ₂₀
Pyrene	ND ₂₀
Benzo(a)Anthracene	ND ₂₀
Chrysene	ND ₂₀
Benzo(b)Fluoranthene	ND ₂₀
Benzo(k)Fluoranthene	ND ₂₀
Benzo(a)Pyrene	ND ₂₀
Indeno(1,2,3-cd)Pyrene	ND ₂₀
Dibenzo(a,h)Anthracene	ND ₂₀
Benzo(g,h,i)Perylene	ND ₂₀

^a ND₂₀ means not detected above a level of 20 $\mu\text{g/L}$ (ppb)

^b Listed in ordering of GC elution time

RESULTS^a FROM FID/CAPILLARY GC ANALYSES OF WATER SAMPLES

FOR POLYNUCLEAR AROMATIC HYDROCARBONS : OXY OIL SHALE

FIELD SAMPLE NO.: BWY46-1-1204-1-31CENTRAL SCIENCES LOG NO.: 08-05-81-83

Sample Received	Sample Extraction/Concentration	Extract Analysis
<u>7-30-81</u>	<u>8-5-81</u>	<u>9-29-81</u>

<u>Compound^b</u>	<u>Concentration $\mu\text{g/L}$ (ppb)</u>
Naphthalene	ND ₂₀
Acenaphthylene	ND ₂₀
Acenaphthene	ND ₂₀
Fluorene	ND ₂₀
Phenanthrene	ND ₂₀
Anthracene	ND ₂₀
Fluoranthene	ND ₂₀
Pyrene	ND ₂₀
Benzo(a)Anthracene	ND ₂₀
Chrysene	ND ₂₀
Benzo(b)Fluoranthene	ND ₂₀
Benzo(k)Fluoranthene	ND ₂₀
Benzo(a)Pyrene	ND ₂₀
Indeno(1,2,3-cd)Pyrene	ND ₂₀
Dibenzo(a,h)Anthracene	ND ₂₀
Benzo(g,h,i)Perylene	ND ₂₀

^a ND₂₀ means not detected above a level of 20 $\mu\text{g/L}$ (ppb)

^b Listed in ordering of GC elution time

RESULTS^a FROM FID/CAPILLARY GC ANALYSES OF WATER SAMPLES

FOR POLYNUCLEAR AROMATIC HYDROCARBONS : OXY OIL SHALE

FIELD SAMPLE NO.: BWD91-1-1197-1-31CENTRAL SCIENCES LOG NO.: 08-05-81-84

Sample Received	Sample Extraction/Concentration	Extract Analysis
<u>7-30-81</u>	<u>8-6-81</u>	<u>10-8-81</u>

<u>Compound^b</u>	<u>Concentration $\mu\text{g/L}$ (ppb)</u>
Naphthalene	35ppb
Acenaphthylene	ND ₂₀
Acenaphthene	ND ₂₀
Fluorene	ND ₂₀
Phenanthrene	ND ₂₀
Anthracene	ND ₂₀
Fluoranthene	ND ₂₀
Pyrene	ND ₂₀
Benzo(a)Anthracene	ND ₂₀
Chrysene	ND ₂₀
Benzo(b)Fluoranthene	ND ₂₀
Benzo(k)Fluoranthene	ND ₂₀
Benzo(a)Pyrene	ND ₂₀
Indeno(1,2,3-cd)Pyrene	ND ₂₀
Dibenzo(a,h)Anthracene	ND ₂₀
Benzo(g,h,i)Perylene	ND ₂₀

^a ND₂₀ means not detected above a level of 20 $\mu\text{g/L}$ (ppb)

^b Listed in ordering of GC elution time

RESULTS^a FROM FID/CAPILLARY GC ANALYSES OF WATER SAMPLES

FOR POLYNUCLEAR AROMATIC HYDROCARBONS : OXY OIL SHALE

FIELD SAMPLE NO.: BWD21-1-1197-1-31CENTRAL SCIENCES LOG NO.: 08-05-81-85

Sample Received	Sample Extraction/Concentration	Extract Analysis
<u>7-30-81</u>	<u>8-6-81</u>	<u>9-29-81</u>

<u>Compound^b</u>	<u>Concentration $\mu\text{g/L}$ (ppb)</u>
Naphthalene	ND ₂₀
Acenaphthylene	ND ₂₀
Acenaphthene	ND ₂₀
Fluorene	ND ₂₀
Phenanthrene	ND ₂₀
Anthracene	ND ₂₀
Fluoranthene	ND ₂₀
Pyrene	ND ₂₀
Benzo(a)Anthracene	ND ₂₀
Chrysene	ND ₂₀
Benzo(b)Fluoranthene	ND ₂₀
Benzo(k)Fluoranthene	ND ₂₀
Benzo(a)Pyrene	ND ₂₀
Indeno(1,2,3-cd)Pyrene	ND ₂₀
Dibenzo(a,h)Anthracene	ND ₂₀
Benzo(g,h,i)Perylene	ND ₂₀

^a ND₂₀ means not detected above a level of 20 $\mu\text{g/L}$ (ppb)

^b Listed in ordering of GC elution time

RESULTS^a FROM FID/CAPILLARY GC ANALYSES OF WATER SAMPLES

FOR POLYNUCLEAR AROMATIC HYDROCARBONS : OXY OIL SHALE

FIELD SAMPLE NO.: BWG12-1-1196-1-31CENTRAL SCIENCES LOG NO.: 08-05-81-86

Sample Received	Sample Extraction/Concentration	Extract Analysis
<u>7-30-81</u>	<u>8-6-81</u>	<u>9-29-81</u>

<u>Compound^b</u>	<u>Concentration $\mu\text{g/L}$ (ppb)</u>
Naphthalene	ND ₂₀
Acenaphthylene	ND ₂₀
Acenaphthene	ND ₂₀
Fluorene	ND ₂₀
Phenanthrene	ND ₂₀
Anthracene	ND ₂₀
Fluoranthene	ND ₂₀
Pyrene	ND ₂₀
Benzo(a)Anthracene	ND ₂₀
Chrysene	ND ₂₀
Benzo(b)Fluoranthene	ND ₂₀
Benzo(k)Fluoranthene	ND ₂₀
Benzo(a)Pyrene	ND ₂₀
Indeno(1,2,3-cd)Pyrene	ND ₂₀
Dibenzo(a,h)Anthracene	ND ₂₀
Benzo(g,h,i)Perylene	ND ₂₀

^a ND₂₀ means not detected above a level of 20 $\mu\text{g/L}$ (ppb)

^b Listed in ordering of GC elution time

RESULTS^a FROM FID/CAPILLARY GC ANALYSES OF WATER SAMPLES

FOR POLYNUCLEAR AROMATIC HYDROCARBONS : OXY OIL SHALE

FIELD SAMPLE NO.: BWY81-1-1202-1-31CENTRAL SCIENCES LOG NO.: 08-06-81-87

Sample Received	Sample Extraction/Concentration	Extract Analysis
<u>7-30-81</u>	<u>8-6-81</u>	<u>9-29-81</u>

<u>Compound^b</u>	<u>Concentration $\mu\text{g/L}$ (ppb)</u>
Naphthalene	ND ₂₀
Acenaphthylene	ND ₂₀
Acenaphthene	ND ₂₀
Fluorene	ND ₂₀
Phenanthrene	ND ₂₀
Anthracene	ND ₂₀
Fluoranthene	ND ₂₀
Pyrene	ND ₂₀
Benzo(a)Anthracene	ND ₂₀
Chrysene	ND ₂₀
Benzo(b)Fluoranthene	ND ₂₀
Benzo(k)Fluoranthene	ND ₂₀
Benzo(a)Pyrene	ND ₂₀
Indeno(1,2,3-cd)Pyrene	ND ₂₀
Dibenzo(a,h)Anthracene	ND ₂₀
Benzo(g,h,i)Perylene	ND ₂₀

^a ND₂₀ means not detected above a level of 20 $\mu\text{g/L}$ (ppb)^b Listed in ordering of GC elution time

RESULTS^a FROM FID/CAPILLARY GC ANALYSES OF WATER SAMPLES

FOR POLYNUCLEAR AROMATIC HYDROCARBONS : OXY OIL SHALE

FIELD SAMPLE NO.: BWD12-1-1196-1-31CENTRAL SCIENCES LOG NO.: 08-06-81-88

Sample Received	Sample Extraction/Concentration	Extract Analysis
<u>7-30-81</u>	<u>8-6-81</u>	<u>9-29-81</u>

<u>Compound^b</u>	<u>Concentration $\mu\text{g/L}$ (ppb)</u>
Naphthalene	ND ₂₀
Acenaphthylene	ND ₂₀
Acenaphthene	ND ₂₀
Fluorene	ND ₂₀
Phenanthrene	ND ₂₀
Anthracene	ND ₂₀
Fluoranthene	ND ₂₀
Pyrene	ND ₂₀
Benzo(a)Anthracene	ND ₂₀
Chrysene	ND ₂₀
Benzo(b)Fluoranthene	ND ₂₀
Benzo(k)Fluoranthene	ND ₂₀
Benzo(a)Pyrene	ND ₂₀
Indeno(1,2,3-cd)Pyrene	ND ₂₀
Dibenzo(a,h)Anthracene	ND ₂₀
Benzo(g,h,i)Perylene	ND ₂₀

^a ND₂₀ means not detected above a level of 20 $\mu\text{g/L}$ (ppb)

^b Listed in ordering of GC elution time

RESULTS^a FROM FID/CAPILLARY GC ANALYSES OF WATER SAMPLES

FOR POLYNUCLEAR AROMATIC HYDROCARBONS : OXY OIL SHALE

FIELD SAMPLE NO.: BWE52-1-1202-1-31CENTRAL SCIENCES LOG NO.: 08-06-81-89

Sample Received	Sample Extraction/Concentration	Extract Analysis
<u>7-30-81</u>	<u>8-6-81</u>	<u>9-29-81</u>

<u>Compound^b</u>	<u>Concentration $\mu\text{g/L}$ (ppb)</u>
Naphthalene	ND ₂₀
Acenaphthylene	ND ₂₀
Acenaphthene	ND ₂₀
Fluorene	ND ₂₀
Phenanthrene	ND ₂₀
Anthracene	ND ₂₀
Fluoranthene	ND ₂₀
Pyrene	ND ₂₀
Benzo(a)Anthracene	ND ₂₀
Chrysene	ND ₂₀
Benzo(b)Fluoranthene	ND ₂₀
Benzo(k)Fluoranthene	ND ₂₀
Benzo(a)Pyrene	ND ₂₀
Indeno(1,2,3-cd)Pyrene	ND ₂₀
Dibenzo(a,h)Anthracene	ND ₂₀
Benzo(g,h,i)Perylene	ND ₂₀

^a ND₂₀ means not detected above a level of 20 $\mu\text{g/L}$ (ppb)

^b Listed in ordering of GC elution time

RESULTS^a FROM FID/CAPILLARY GC ANALYSES OF WATER SAMPLES

FOR POLYNUCLEAR AROMATIC HYDROCARBONS : OXY OIL SHALE

FIELD SAMPLE NO.: BWD41-1-1204-1-31CENTRAL SCIENCES LOG NO.: 08-06-81-90

Sample Received	Sample Extraction/Concentration	Extract Analysis
<u>7-30-81</u>	<u>8-6-81</u>	<u>10-8-81</u>

<u>Compound^b</u>	<u>Concentration $\mu\text{g/L}$ (ppb)</u>
Naphthalene	ND ₂₀
Acenaphthylene	ND ₂₀
Acenaphthene	ND ₂₀
Fluorene	ND ₂₀
Phenanthrene	ND ₂₀
Anthracene	ND ₂₀
Fluoranthene	ND ₂₀
Pyrene	ND ₂₀
Benzo(a)Anthracene	ND ₂₀
Chrysene	ND ₂₀
Benzo(b)Fluoranthene	ND ₂₀
Benzo(k)Fluoranthene	ND ₂₀
Benzo(a)Pyrene	ND ₂₀
Indeno(1,2,3-cd)Pyrene	ND ₂₀
Dibenzo(a,h)Anthracene	ND ₂₀
Benzo(g,h,i)Perylene	ND ₂₀

^a ND₂₀ means not detected above a level of 20 $\mu\text{g/L}$ (ppb)

^b Listed in ordering of GC elution time

RESULTS^a FROM FID/CAPILLARY GC ANALYSES OF WATER SAMPLES

FOR POLYNUCLEAR AROMATIC HYDROCARBONS : OXY OIL SHALE

FIELD SAMPLE NO.: BWD52-1-1202-1-31CENTRAL SCIENCES LOG NO.: 08-06-81-91

Sample Received	Sample Extraction/Concentration	Extract Analysis
<u>7-30-81</u>	<u>8-6-81</u>	<u>9-30-81</u>

<u>Compound^b</u>	<u>Concentration $\mu\text{g/L}$ (ppb)</u>
Naphthalene	ND ₂₀
Acenaphthylene	ND ₂₀
Acenaphthene	ND ₂₀
Fluorene	ND ₂₀
Phenanthrene	ND ₂₀
Anthracene	ND ₂₀
Fluoranthene	ND ₂₀
Pyrene	ND ₂₀
Benzo(a)Anthracene	ND ₂₀
Chrysene	ND ₂₀
Benzo(b)Fluoranthene	ND ₂₀
Benzo(k)Fluoranthene	ND ₂₀
Benzo(a)Pyrene	ND ₂₀
Indeno(1,2,3-cd)Pyrene	ND ₂₀
Dibenzo(a,h)Anthracene	ND ₂₀
Benzo(g,h,i)Perylene	ND ₂₀

^a ND₂₀ means not detected above a level of 20 $\mu\text{g/L}$ (ppb)^b Listed in ordering of GC elution time

RESULTS^a FROM FID/CAPILLARY GC ANALYSES OF WATER SAMPLES

FOR POLYNUCLEAR AROMATIC HYDROCARBONS : OXY OIL SHALE

FIELD SAMPLE NO.: BWC61-1-1201-1-31CENTRAL SCIENCES LOG NO.: 08-06-81-92

Sample Received	Sample Extraction/Concentration	Extract Analysis
<u>7-30-81</u>	<u>8-6-81</u>	<u>10-8-81</u>

<u>Compound^b</u>	<u>Concentration $\mu\text{g/L}$ (ppb)</u>
Naphthalene	ND ₂₀
Acenaphthylene	ND ₂₀
Acenaphthene	ND ₂₀
Fluorene	ND ₂₀
Phenanthrene	ND ₂₀
Anthracene	ND ₂₀
Fluoranthene	ND ₂₀
Pyrene	ND ₂₀
Benzo(a)Anthracene	ND ₂₀
Chrysene	ND ₂₀
Benzo(b)Fluoranthene	ND ₂₀
Benzo(k)Fluoranthene	ND ₂₀
Benzo(a)Pyrene	ND ₂₀
Indeno(1,2,3-cd)Pyrene	ND ₂₀
Dibenzo(a,h)Anthracene	ND ₂₀
Benzo(g,h,i)Perylene	ND ₂₀

^a ND₂₀ means not detected above a level of 20 $\mu\text{g/L}$ (ppb)

^b Listed in ordering of GC elution time

RESULTS^a FROM FID/CAPILLARY GC ANALYSES OF WATER SAMPLES

FOR POLYNUCLEAR AROMATIC HYDROCARBONS : OXY OIL SHALE

FIELD SAMPLE NO.: BWG91-1-1197-1-31CENTRAL SCIENCES LOG NO.: 08-06-81-93

Sample Received	Sample Extraction/Concentration	Extract Analysis
<u>7-30-81</u>	<u>8-6-81</u>	<u>9-30-81</u>

<u>Compound^b</u>	<u>Concentration $\mu\text{g/L}$ (ppb)</u>
Naphthalene	ND ₂₀
Acenaphthylene	ND ₂₀
Acenaphthene	ND ₂₀
Fluorene	ND ₂₀
Phenanthrene	ND ₂₀
Anthracene	ND ₂₀
Fluoranthene	ND ₂₀
Pyrene	ND ₂₀
Benzo(a)Anthracene	ND ₂₀
Chrysene	ND ₂₀
Benzo(b)Fluoranthene	ND ₂₀
Benzo(k)Fluoranthene	ND ₂₀
Benzo(a)Pyrene	ND ₂₀
Indeno(1,2,3-cd)Pyrene	ND ₂₀
Dibenzo(a,h)Anthracene	ND ₂₀
Benzo(g,h,i)Perylene	ND ₂₀

^a ND₂₀ means not detected above a level of 20 $\mu\text{g/L}$ (ppb)

^b Listed in ordering of GC elution time

RESULTS^a FROM FID/CAPILLARY GC ANALYSES OF WATER SAMPLES

FOR POLYNUCLEAR AROMATIC HYDROCARBONS : OXY OIL SHALE

FIELD SAMPLE NO.: BWY45-1-1204-1-31CENTRAL SCIENCES LOG NO.: 08-06-81-94

Sample Received	Sample Extraction/Concentration	Extract Analysis
<u>7-30-81</u>	<u>8-6-81</u>	<u>9-30-81</u>

<u>Compound^b</u>	<u>Concentration $\mu\text{g/L}$ (ppb)</u>
Naphthalene	ND ₂₀
Acenaphthylene	ND ₂₀
Acenaphthene	ND ₂₀
Fluorene	ND ₂₀
Phenanthrene	ND ₂₀
Anthracene	ND ₂₀
Fluoranthene	ND ₂₀
Pyrene	ND ₂₀
Benzo(a)Anthracene	ND ₂₀
Chrysene	ND ₂₀
Benzo(b)Fluoranthene	ND ₂₀
Benzo(k)Fluoranthene	ND ₂₀
Benzo(a)Pyrene	ND ₂₀
Indeno(1,2,3-cd)Pyrene	ND ₂₀
Dibenzo(a,h)Anthracene	ND ₂₀
Benzo(g,h,i)Perylene	ND ₂₀

^a ND₂₀ means not detected above a level of 20 $\mu\text{g/L}$ (ppb)

^b Listed in ordering of GC elution time

RESULTS^a FROM FID/CAPILLARY GC ANALYSES OF WATER SAMPLES

FOR POLYNUCLEAR AROMATIC HYDROCARBONS : OXY OIL SHALE

FIELD SAMPLE NO.: BWG41-1-1205-1-31CENTRAL SCIENCES LOG NO.: 08-10-81-95

Sample Received	Sample Extraction/Concentration	Extract Analysis
<u>8-7-81</u>	<u>8-10-81</u>	<u>9-30-81</u>

<u>Compound^b</u>	<u>Concentration $\mu\text{g/L}$ (ppb)</u>
Naphthalene	ND ₂₀
Acenaphthylene	ND ₂₀
Acenaphthene	ND ₂₀
Fluorene	ND ₂₀
Phenanthrene	ND ₂₀
Anthracene	ND ₂₀
Fluoranthene	ND ₂₀
Pyrene	ND ₂₀
Benzo(a)Anthracene	ND ₂₀
Chrysene	ND ₂₀
Benzo(b)Fluoranthene	ND ₂₀
Benzo(k)Fluoranthene	ND ₂₀
Benzo(a)Pyrene	ND ₂₀
Indeno(1,2,3-cd)Pyrene	ND ₂₀
Dibenzo(a,h)Anthracene	ND ₂₀
Benzo(g,h,i)Perylene	ND ₂₀

^a ND₂₀ means not detected above a level of 20 $\mu\text{g/L}$ (ppb)

^b Listed in ordering of GC elution time

RESULTS^a FROM FID/CAPILLARY GC ANALYSES OF WATER SAMPLES

FOR POLYNUCLEAR AROMATIC HYDROCARBONS : OXY OIL SHALE

FIELD SAMPLE NO.: BWE51-1-1208-1-31CENTRAL SCIENCES LOG NO.: 08-10-81-96

Sample Received	Sample Extraction/Concentration	Extract Analysis
<u>8-7-81</u>	<u>8-10-81</u>	<u>10-12-81</u>

<u>Compound^b</u>	<u>Concentration $\mu\text{g/L}$ (ppb)</u>
Naphthalene	ND ₂₀
Acenaphthylene	ND ₂₀
Acenaphthene	ND ₂₀
Fluorene	ND ₂₀
Phenanthrene	ND ₂₀
Anthracene	ND ₂₀
Fluoranthene	ND ₂₀
Pyrene	ND ₂₀
Benzo(a)Anthracene	ND ₂₀
Chrysene	ND ₂₀
Benzo(b)Fluoranthene	ND ₂₀
Benzo(k)Fluoranthene	ND ₂₀
Benzo(a)Pyrene	ND ₂₀
Indeno(1,2,3-cd)Pyrene	ND ₂₀
Dibenzo(a,h)Anthracene	ND ₂₀
Benzo(g,h,i)Perylene	ND ₂₀

^a ND₂₀ means not detected above a level of 20 $\mu\text{g/L}$ (ppb)

^b Listed in ordering of GC elution time

RESULTS^a FROM FID/CAPILLARY GC ANALYSES OF WATER SAMPLES

FOR POLYNUCLEAR AROMATIC HYDROCARBONS : OXY OIL SHALE

FIELD SAMPLE NO.: BWG18-1-1210-1-31CENTRAL SCIENCES LOG NO.: 08-10-81-97

Sample Received	Sample Extraction/Concentration	Extract Analysis
<u>8-7-81</u>	<u>8-10-81</u>	<u>9-30-81</u>

<u>Compound^b</u>	<u>Concentration $\mu\text{g/L}$ (ppb)</u>
Naphthalene	ND ₂₀
Acenaphthylene	ND ₂₀
Acenaphthene	ND ₂₀
Fluorene	ND ₂₀
Phenanthrene	ND ₂₀
Anthracene	ND ₂₀
Fluoranthene	ND ₂₀
Pyrene	ND ₂₀
Benzo(a)Anthracene	ND ₂₀
Chrysene	ND ₂₀
Benzo(b)Fluoranthene	ND ₂₀
Benzo(k)Fluoranthene	ND ₂₀
Benzo(a)Pyrene	ND ₂₀
Indeno(1,2,3-cd)Pyrene	ND ₂₀
Dibenzo(a,h)Anthracene	ND ₂₀
Benzo(g,h,i)Perylene	ND ₂₀

^a ND₂₀ means not detected above a level of 20 $\mu\text{g/L}$ (ppb)

^b Listed in ordering of GC elution time

RESULTS^a FROM FID/CAPILLARY GC ANALYSES OF WATER SAMPLES

FOR POLYNUCLEAR AROMATIC HYDROCARBONS : OXY OIL SHALE

FIELD SAMPLE NO.: BWG17-1-1209-1-31CENTRAL SCIENCES LOG NO.: 08-10-81-98

Sample Received	Sample Extraction/Concentration	Extract Analysis
<u>7-30-81</u>	<u>8-10-81</u>	<u>9-30-81</u>

<u>Compound^b</u>	<u>Concentration $\mu\text{g/L}$ (ppb)</u>
Naphthalene	30ppb
Acenaphthylene	ND ₂₀
Acenaphthene	ND ₂₀
Fluorene	ND ₂₀
Phenanthrene	ND ₂₀
Anthracene	ND ₂₀
Fluoranthene	ND ₂₀
Pyrene	ND ₂₀
Benzo(a)Anthracene	ND ₂₀
Chrysene	ND ₂₀
Benzo(b)Fluoranthene	ND ₂₀
Benzo(k)Fluoranthene	ND ₂₀
Benzo(a)Pyrene	ND ₂₀
Indeno(1,2,3-cd)Pyrene	ND ₂₀
Dibenzo(a,h)Anthracene	ND ₂₀
Benzo(g,h,i)Perylene	ND ₂₀

^a ND₂₀ means not detected above a level of 20 $\mu\text{g/L}$ (ppb)

^b Listed in ordering of GC elution time

RESULTS^a FROM FID/CAPILLARY GC ANALYSES OF WATER SAMPLES

FOR POLYNUCLEAR AROMATIC HYDROCARBONS : OXY OIL SHALE

FIELD SAMPLE NO.: BWG51-1-1208-1-31CENTRAL SCIENCES LOG NO.: 08-10-81-99

Sample Received	Sample Extraction/Concentration	Extract Analysis
<u>8-7-81</u>	<u>8-10-81</u>	<u>9-30-81</u>

<u>Compound^b</u>	<u>Concentration $\mu\text{g/L}$ (ppb)</u>
Naphthalene	ND ₂₀
Acenaphthylene	ND ₂₀
Acenaphthene	ND ₂₀
Fluorene	ND ₂₀
Phenanthrene	ND ₂₀
Anthracene	ND ₂₀
Fluoranthene	ND ₂₀
Pyrene	ND ₂₀
Benzo(a)Anthracene	ND ₂₀
Chrysene	ND ₂₀
Benzo(b)Fluoranthene	ND ₂₀
Benzo(k)Fluoranthene	ND ₂₀
Benzo(a)Pyrene	ND ₂₀
Indeno(1,2,3-cd)Pyrene	ND ₂₀
Dibenzo(a,h)Anthracene	ND ₂₀
Benzo(g,h,i)Perylene	ND ₂₀

^a ND₂₀ means not detected above a level of 20 $\mu\text{g/L}$ (ppb)

^b Listed in ordering of GC elution time

RESULTS^a FROM FID/CAPILLARY GC ANALYSES OF WATER SAMPLES

FOR POLYNUCLEAR AROMATIC HYDROCARBONS : OXY OIL SHALE

FIELD SAMPLE NO.: BWV37-1-1211-1-31CENTRAL SCIENCES LOG NO.: 08-10-81-100

Sample Received	Sample Extraction/Concentration	Extract Analysis
<u>8-7-81</u>	<u>8-10-81</u>	<u>9-30-81</u>

<u>Compound^b</u>	<u>Concentration $\mu\text{g/L}$ (ppb)</u>
Naphthalene	ND ₂₀
Acenaphthylene	ND ₂₀
Acenaphthene	ND ₂₀
Fluorene	ND ₂₀
Phenanthrene	ND ₂₀
Anthracene	ND ₂₀
Fluoranthene	ND ₂₀
Pyrene	ND ₂₀
Benzo(a)Anthracene	ND ₂₀
Chrysene	ND ₂₀
Benzo(b)Fluoranthene	ND ₂₀
Benzo(k)Fluoranthene	ND ₂₀
Benzo(a)Pyrene	ND ₂₀
Indeno(1,2,3-cd)Pyrene	ND ₂₀
Dibenzo(a,h)Anthracene	ND ₂₀
Benzo(g,h,i)Perylene	ND ₂₀

^a ND₂₀ means not detected above a level of 20 $\mu\text{g/L}$ (ppb)

^b Listed in ordering of GC elution time

RESULTS^a FROM FID/CAPILLARY GC ANALYSES OF WATER SAMPLES

FOR POLYNUCLEAR AROMATIC HYDROCARBONS : OXY OIL SHALE

FIELD SAMPLE NO.: BWE17-1-1209-1-31CENTRAL SCIENCES LOG NO.: 08-10-81-101

Sample Received	Sample Extraction/Concentration	Extract Analysis
<u>8-7-81</u>	<u>8-10-81</u>	<u>10-1-81</u>

<u>Compound</u> ^b	<u>Concentration $\mu\text{g/L}$ (ppb)</u>
Naphthalene	100ppb
Acenaphthylene	ND ₂₀
Acenaphthene	ND ₂₀
Fluorene	ND ₂₀
Phenanthrene	ND ₂₀
Anthracene	ND ₂₀
Fluoranthene	ND ₂₀
Pyrene	ND ₂₀
Benzo(a)Anthracene	ND ₂₀
Chrysene	ND ₂₀
Benzo(b)Fluoranthene	ND ₂₀
Benzo(k)Fluoranthene	ND ₂₀
Benzo(a)Pyrene	ND ₂₀
Indeno(1,2,3-cd)Pyrene	ND ₂₀
Dibenzo(a,h)Anthracene	ND ₂₀
Benzo(g,h,i)Perylene	ND ₂₀

^a ND₂₀ means not detected above a level of 20 $\mu\text{g/L}$ (ppb)

^b Listed in ordering of GC elution time

RESULTS^a FROM FID/CAPILLARY GC ANALYSES OF WATER SAMPLES

FOR POLYNUCLEAR AROMATIC HYDROCARBONS : OXY OIL SHALE

FIELD SAMPLE NO.: BWC17-1-1209-1-31CENTRAL SCIENCES LOG NO.: 08-10-81-102

Sample Received	Sample Extraction/Concentration	Extract Analysis
<u>8-7-81</u>	<u>8-10-81</u>	<u>10-1-81</u>

<u>Compound^b</u>	<u>Concentration $\mu\text{g/L}$ (ppb)</u>
Naphthalene	ND ₂₀
Acenaphthylene	ND ₂₀
Acenaphthene	ND ₂₀
Fluorene	ND ₂₀
Phenanthrene	ND ₂₀
Anthracene	ND ₂₀
Fluoranthene	ND ₂₀
Pyrene	ND ₂₀
Benzo(a)Anthracene	ND ₂₀
Chrysene	ND ₂₀
Benzo(b)Fluoranthene	ND ₂₀
Benzo(k)Fluoranthene	ND ₂₀
Benzo(a)Pyrene	ND ₂₀
Indeno(1,2,3-cd)Pyrene	ND ₂₀
Dibenzo(a,h)Anthracene	ND ₂₀
Benzo(g,h,i)Perylene	ND ₂₀

^a ND₂₀ means not detected above a level of 20 $\mu\text{g/L}$ (ppb)

^b Listed in ordering of GC elution time

RESULTS^a FROM FID/CAPILLARY GC ANALYSES OF WATER SAMPLES

FOR POLYNUCLEAR AROMATIC HYDROCARBONS : OXY OIL SHALE

FIELD SAMPLE NO.: BWE18-1-1210-1-31CENTRAL SCIENCES LOG NO.: 08-10-81-103

Sample Received	Sample Extraction/Concentration	Extract Analysis
<u>8-7-81</u>	<u>8-10-81</u>	<u>10-1-81</u>

<u>Compound^b</u>	<u>Concentration $\mu\text{g/L}$ (ppb)</u>
Naphthalene	80ppb
Acenaphthylene	ND ₂₀
Acenaphthene	ND ₂₀
Fluorene	ND ₂₀
Phenanthrene	ND ₂₀
Anthracene	ND ₂₀
Fluoranthene	ND ₂₀
Pyrene	ND ₂₀
Benzo(a)Anthracene	ND ₂₀
Chrysene	ND ₂₀
Benzo(b)Fluoranthene	ND ₂₀
Benzo(k)Fluoranthene	ND ₂₀
Benzo(a)Pyrene	ND ₂₀
Indeno(1,2,3-cd)Pyrene	ND ₂₀
Dibenzo(a,h)Anthracene	ND ₂₀
Benzo(g,h,i)Perylene	ND ₂₀

^a ND₂₀ means not detected above a level of 20 $\mu\text{g/L}$ (ppb)

^b Listed in ordering of GC elution time

RESULTS^a FROM FID/CAPILLARY GC ANALYSES OF WATER SAMPLES

FOR POLYNUCLEAR AROMATIC HYDROCARBONS : OXY OIL SHALE

FIELD SAMPLE NO.: BWD10-1-1208-1-31CENTRAL SCIENCES LOG NO.: 08-10-81-104

Sample Received	Sample Extraction/Concentration	Extract Analysis
<u>8-7-81</u>	<u>8-10-81</u>	<u>10-8-81</u>

<u>Compound^b</u>	<u>Concentration $\mu\text{g/L}$ (ppb)</u>
Naphthalene	ND ₂₀
Acenaphthylene	ND ₂₀
Acenaphthene	ND ₂₀
Fluorene	ND ₂₀
Phenanthrene	ND ₂₀
Anthracene	ND ₂₀
Fluoranthene	ND ₂₀
Pyrene	ND ₂₀
Benzo(a)Anthracene	ND ₂₀
Chrysene	ND ₂₀
Benzo(b)Fluoranthene	ND ₂₀
Benzo(k)Fluoranthene	ND ₂₀
Benzo(a)Pyrene	ND ₂₀
Indeno(1,2,3-cd)Pyrene	ND ₂₀
Dibenzo(a,h)Anthracene	ND ₂₀
Benzo(g,h,i)Perylene	ND ₂₀

^a ND₂₀ means not detected above a level of 20 $\mu\text{g/L}$ (ppb)

^b Listed in ordering of GC elution time

RESULTS^a FROM FID/CAPILLARY GC ANALYSES OF WATER SAMPLES

FOR POLYNUCLEAR AROMATIC HYDROCARBONS : OXY OIL SHALE

FIELD SAMPLE NO.: BWE20-1-1210-1-31CENTRAL SCIENCES LOG NO.: 08-10-81-105

Sample Received	Sample Extraction/Concentration	Extract Analysis
<u>8-7-81</u>	<u>8-10-81</u>	<u>10-1-81</u>

<u>Compound^b</u>	<u>Concentration $\mu\text{g/L}$ (ppb)</u>
Naphthalene	ND ₂₀
Acenaphthylene	ND ₂₀
Acenaphthene	ND ₂₀
Fluorene	ND ₂₀
Phenanthrene	ND ₂₀
Anthracene	ND ₂₀
Fluoranthene	ND ₂₀
Pyrene	ND ₂₀
Benzo(a)Anthracene	ND ₂₀
Chrysene	ND ₂₀
Benzo(b)Fluoranthene	ND ₂₀
Benzo(k)Fluoranthene	ND ₂₀
Benzo(a)Pyrene	ND ₂₀
Indeno(1,2,3-cd)Pyrene	ND ₂₀
Dibenzo(a,h)Anthracene	ND ₂₀
Benzo(g,h,i)Perylene	ND ₂₀

^a ND₂₀ means not detected above a level of 20 $\mu\text{g/L}$ (ppb)

^b Listed in ordering of GC elution time

RESULTS^a FROM FID/CAPILLARY GC ANALYSES OF WATER SAMPLES

FOR POLYNUCLEAR AROMATIC HYDROCARBONS : OXY OIL SHALE

FIELD SAMPLE NO.: BWG20-1-1210-1-31CENTRAL SCIENCES LOG NO.: 08-10-81-106

Sample Received	Sample Extraction/Concentration	Extract Analysis
<u>8-7-81</u>	<u>8-10-81</u>	<u>10-1-81</u>

<u>Compound^b</u>	<u>Concentration $\mu\text{g/L}$ (ppb)</u>
Naphthalene	ND ₂₀
Acenaphthylene	ND ₂₀
Acenaphthene	ND ₂₀
Fluorene	ND ₂₀
Phenanthrene	ND ₂₀
Anthracene	ND ₂₀
Fluoranthene	ND ₂₀
Pyrene	ND ₂₀
Benzo(a)Anthracene	ND ₂₀
Chrysene	ND ₂₀
Benzo(b)Fluoranthene	ND ₂₀
Benzo(k)Fluoranthene	ND ₂₀
Benzo(a)Pyrene	ND ₂₀
Indeno(1,2,3-cd)Pyrene	ND ₂₀
Dibenzo(a,h)Anthracene	ND ₂₀
Benzo(g,h,i)Perylene	ND ₂₀

^a ND₂₀ means not detected above a level of 20 $\mu\text{g/L}$ (ppb)

^b Listed in ordering of GC elution time

RESULTS^a FROM FID/CAPILLARY GC ANALYSES OF WATER SAMPLES

FOR POLYNUCLEAR AROMATIC HYDROCARBONS : OXY OIL SHALE

FIELD SAMPLE NO.: BWD14-1-1205-1-31CENTRAL SCIENCES LOG NO.: 08-10-81-107

Sample Received	Sample Extraction/Concentration	Extract Analysis
<u>8-7-81</u>	<u>8-10-81</u>	<u>10-12-81</u>

<u>Compound^b</u>	<u>Concentration $\mu\text{g/L}$ (ppb)</u>
Naphthalene (Identification as Naphthalene confirmed by GC spiking: See discussion in report.)	300ppb
Acenaphthylene	ND ₂₀
Acenaphthene	ND ₂₀
Fluorene	ND ₂₀
Phenanthrene	ND ₂₀
Anthracene	ND ₂₀
Fluoranthene	ND ₂₀
Pyrene	ND ₂₀
Benzo(a)Anthracene	ND ₂₀
Chrysene	ND ₂₀
Benzo(b)Fluoranthene	ND ₂₀
Benzo(k)Fluoranthene	ND ₂₀
Benzo(a)Pyrene	ND ₂₀
Indeno(1,2,3-cd)Pyrene	ND ₂₀
Dibenzo(a,h)Anthracene	ND ₂₀
Benzo(g,h,i)Perylene	ND ₂₀

^a ND₂₀ means not detected above a level of 20 $\mu\text{g/L}$ (ppb)

^b Listed in ordering of GC elution time

RESULTS^a FROM FID/CAPILLARY GC ANALYSES OF WATER SAMPLES

FOR POLYNUCLEAR AROMATIC HYDROCARBONS : OXY OIL SHALE

FIELD SAMPLE NO.: BWD18-1-1210-1-31CENTRAL SCIENCES LOG NO.: 08-11-81-108

Sample Received	Sample Extraction/Concentration	Extract Analysis
<u>8-7-81</u>	<u>8-11-81</u>	<u>-----</u>

<u>Compound</u> ^b	<u>Concentration $\mu\text{g/L}$ (ppb)</u>
Naphthalene	ND ₂₀
Acenaphthylene	ND ₂₀
Acenaphthene	ND ₂₀
Fluorene	ND ₂₀
Phenanthrene	
Anthracene	
Fluoranthene	
Pyrene	
Benzo(a)Anthracene	
Chrysene	
Benzo(b)Fluoranthene	ND ₂₀
Benzo(k)Fluoranthene	ND ₂₀
Benzo(a)Pyrene	ND ₂₀
Indeno(1,2,3-cd)Pyrene	ND ₂₀
Dibenzo(a,h)Anthracene	ND ₂₀
Benzo(g,h,i)Perylene	ND ₂₀

} CANNOT ANALYZE WITHOUT SAMPLE CLEANUP

^a ND₂₀ means not detected above a level of 20 $\mu\text{g/L}$ (ppb)

^b Listed in ordering of GC elution time

RESULTS^a FROM FID/CAPILLARY GC ANALYSES OF WATER SAMPLES

FOR POLYNUCLEAR AROMATIC HYDROCARBONS : OXY OIL SHALE

FIELD SAMPLE NO.: BWD20-1-1210-1-31CENTRAL SCIENCES LOG NO.: 08-11-81-109

Sample Received	Sample Extraction/Concentration	Extract Analysis
<u>8-7-81</u>	<u>8-11-81</u>	<u>10-12-81</u>

<u>Compound^b</u>	<u>Concentration $\mu\text{g/L}$ (ppb)</u>
Naphthalene	ND ₂₀
Acenaphthylene	ND ₂₀
Acenaphthene	ND ₂₀
Fluorene	ND ₂₀
Phenanthrene	ND ₂₀
Anthracene	ND ₂₀
Fluoranthene	ND ₂₀
Pyrene	ND ₂₀
Benzo(a)Anthracene	ND ₂₀
Chrysene	ND ₂₀
Benzo(b)Fluoranthene	ND ₂₀
Benzo(k)Fluoranthene	ND ₂₀
Benzo(a)Pyrene	ND ₂₀
Indeno(1,2,3-cd)Pyrene	ND ₂₀
Dibenzo(a,h)Anthracene	ND ₂₀
Benzo(g,h,i)Perylene	ND ₂₀

^a ND₂₀ means not detected above a level of 20 $\mu\text{g/L}$ (ppb)

^b Listed in ordering of GC elution time

RESULTS^a FROM FID/CAPILLARY GC ANALYSES OF WATER SAMPLES
FOR POLYNUCLEAR AROMATIC HYDROCARBONS : OXY OIL SHALE

FIELD SAMPLE NO.: BWD17-1-1209-1-31

CENTRAL SCIENCES LOG NO.: 08-11-81-110

Sample Received	Sample Extraction/Concentration	Extract Analysis
<u>7-30-81</u>	<u>8-11-81</u>	<u>10-8-81</u>

<u>Compound^b</u>	<u>Concentration $\mu\text{g/L}$ (ppb)</u>
Naphthalene	ND ₂₀
Acenaphthylene	ND ₂₀
Acenaphthene	ND ₂₀
Fluorene	ND ₂₀
Phenanthrene	ND ₂₀
Anthracene	ND ₂₀
Fluoranthene	ND ₂₀
Pyrene	ND ₂₀
Benzo(a)Anthracene	ND ₂₀
Chrysene	ND ₂₀
Benzo(b)Fluoranthene	ND ₂₀
Benzo(k)Fluoranthene	ND ₂₀
Benzo(a)Pyrene	ND ₂₀
Indeno(1,2,3-cd)Pyrene	ND ₂₀
Dibenzo(a,h)Anthracene	ND ₂₀
Benzo(g,h,i)Perylene	ND ₂₀

^a ND₂₀ means not detected above a level of 20 $\mu\text{g/L}$ (ppb)

^b Listed in ordering of GC elution time

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